UNIVERSITY OF WASHINGTON
DEPARTMENT OF
OCEANOGRAPHY

Technical Report No. 134

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, JANUARY-JUNE 1963

Volume V

CNAV Oshawa Cruise Oshawa-2: 22 May - 12 June

Brown Bear Cruise 327: 24 June - 1 July

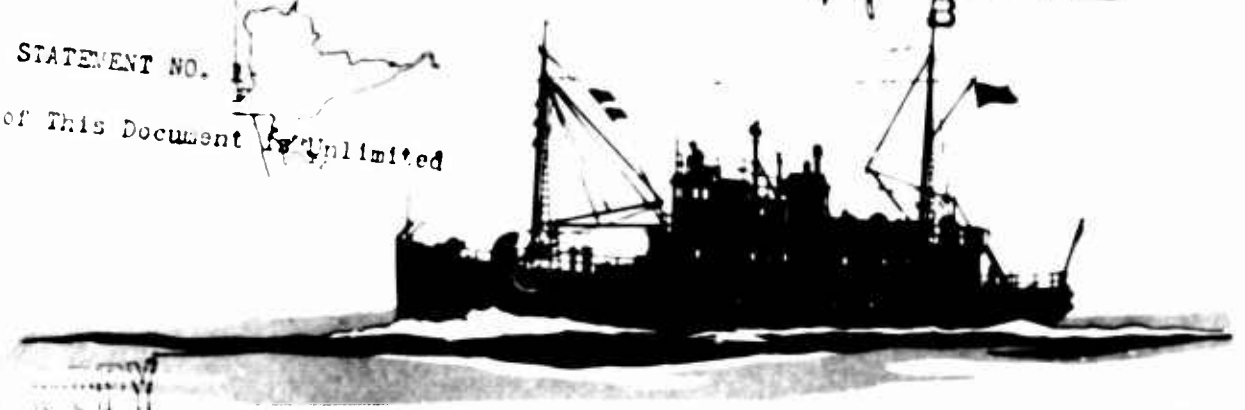
Prepared by
C. M. LOVE
With the Data Analysis Staff

Scientific Program
Under the general direction of
Clifford A. Barnes

U.S. Atomic Energy Commission
Contract No AT(45-1)-1725
RLO-1725-36

Office of Naval Research
Contracts Nonr-477(10)
and Nonr-477(37)
Project NR 083 012

Reference M66-8
March 1966



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RICHARD H. FLEMING
Chairman

CLIFFORD A. BARNES
Principal Investigator

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INTRODUCTION

This report constitutes Volume V of Technical Report No. 134 and contains data from Cruise Oshawa-2, 22 May - 12 June 1963, and Brown Bear Cruise 327, 24 June - 1 July 1963. A discussion of the objectives of these cruises and the scientific program of which they were a part will be found in Volume I, together with descriptions of the observations made, the methods of collecting samples and the methods of determination of properties. A list of the personnel engaged in collecting and preparing the data and a bibliography will also be found in Volume I.

The cruise tracks and station locations for cruises Oshawa-2 and Brown Bear 327 will be found in Figures 1 and 2 of this volume.

The values of phosphate, silicate, and nitrate reported for Cruise Oshawa-2 were obtained from the analysis of samples which were frozen aboard ship immediately after collection and returned to Seattle for later analysis ashore. Phosphate data reported for Cruise 327 were obtained from shipboard analysis of unfrozen samples.

EXPLANATION OF DATA TABLES

The information in the data tables was transcribed directly from IBM cards using an IBM 1401 Data Processing System. A blank space in the tables or headings indicates that no observation was taken. The original data and the interpolated and computed values punched on the cards are in most cases recorded or coded in accordance with the procedures used by the National Oceanographic Data Center; however, some weather information is coded with U.S. Navy Hydrographic Office codes. The codes used to describe weather and sea conditions, etc., will be found in NODC Publication M-2 (National Oceanographic Data Center, 1964) or in H.O. Publication No. 606-c (U.S. Navy Hydrographic Office, 1956) and H.O. Publication No. 607 (U.S. Navy Hydrographic Office, 1955a). (See References in Volume I.) Some changes were made in the card format, but these do not affect the arrangement of the data in this report. Abbreviations and column headings are described below and, where necessary, the NODC or Hydrographic Office numerical codes have been reproduced to aid in interpreting the data.

Abbreviations and Headings Used in Data Tables

DATE	For Observed Values the date given is Greenwich day/month/year. For Biological Data the date given is local (ship's time, +8 zone) day/month/year.
HR (Hour)	Greenwich mean time to the nearest tenth of an hour of the messenger drop on the first cast.

LAT (Latitude and LONG (Longitude)	In degrees and minutes; or in degrees, minutes, and tenths of minutes on some stations.
SNDG (Depth of water)	Depth of water in meters at the station as determined by the ship's echo sounder. This depth was generally recorded immediately after the ship arrived on station.
WEA (Weather)	State of the weather. One of two possible codes was used for reporting present weather. A two-digit number in this space indicates use of WMO Code 4677, shown on page 9; one number preceded by an X indicates use of WMO Code 4501, shown on page 11. The X has no significance except to indicate which code was used.
WIND VEL __ DIR __ (Wind velocity and direction)	Wind velocity in knots. Wind direction, see code, page 8.
BAROM (Barometric pressure)	To obtain the barometric pressure in millibars, add 900 if this number is above 50; add 1000 if below 50.
TEMP DRY __ WET __ (Air temperature, dry, wet bulb)	In degrees Celsius
RELHU (Relative Humidity)	Expressed in per cent
WTRCLR (Water color)	Expressed according to the Forel-Ule scale. See code, page 10.
SECDI (Water transparency)	Depth in meters to which a 12-inch (30.5 cm) Secchi disk could be seen on daylight stations.
SEA __ DIR __ (Sea state and direction)	State of the sea, see code, page 8. Direction from which sea was coming, see code, page 8.
SWELL __ DIR __ (Swell amount and direction)	Height and wave length of swell, see code, page 8. Direction from which swell was coming, see code, page 8.

DOM WAVE DIR __ HT __ PER __ (Dominant wave direction, height, and period)	Dominant wave characteristics (National Oceanographic Data Center, 1964) were reported on some cruises instead of sea and swell. Direction from which waves were coming, see code, page 8 . Height of waves, see code, page 10. Period of waves, see code, page 11.
CLOUD TYPE __ AMT __ (Cloud type and amount)	Cloud type, see code, page 7 . Amount of cloud cover, see code, page 7 .
VIS (Visibility)	Range of visibility. See code, page 7 .
WIRE ANGLE(S)	In degrees. Wire angles are tabulated only for those casts whose numbers appear in the "Cast" column at the left of the page, i.e., casts from which data were obtained. The first number is the wire angle for Cast 1, or the lowest numbered cast appearing, the second for Cast 2, etc. Dashes (- -) indicate the wire angle was not recorded for that cast.
CST (Cast)	Cast number.
DEPTH	Depth in meters from which sample was obtained.
TEMP (Temperature)	In degrees Celsius.
SAL (Salinity)	In parts per thousand (°/oo)
SIGMA-T (σ_t)	An expression for the density of sea water at atmospheric pressure, having the indicated temperature and salinity. To convert sigma-t values to density, divide by 1000 and add 1; thus sigma-t 22.42 = density 1.02242.
OXYGEN (Dissolved Oxygen)	
ML/L	In milliliters per liter
MGA/L	In milligram-atoms per liter
AOU (Apparent oxygen utilization)	In milligram-atoms per liter
SATN (Saturation)	Per cent of oxygen saturation
PHOS (Phosphate-phosphorus)	In microgram-atoms per liter (μg-at/l)

NITR (Nitrate-nitrogen)	In microgram-atoms per liter (μg-at/l)
SIL (Silicate-silicon)	In microgram-atoms per liter (μg-at/l)
CHL-A (Chlorophyll a)	In milligrams per cubic meter
PRODUCTIVITY, LAB-I (Incubator productivity)	Expressed as milligrams carbon assimilated per cubic meter per hour.
PRODUCTIVITY, DECK-I (Simulated in situ productivity)	Expressed as milligrams carbon assimilated per cubic meter per day.
LIGHT SAT	Data from light saturation experiments. Refer to text, page 6 of Volume I.
PROD (Productivity)	Productivity of sample receiving the indicated amount of illumination. Expressed as milligrams of carbon assimilated per cubic meter per hour.
FILT (Filter)	Indicates the per cent of total incubator illumination transmitted to the sample through a neutral density filter. The total incubator illumination in units of lux is listed at the bottom of the Biological Data section.
IRRAD (Irradiance)	Per cent of surface solar radiation reaching the indicated depth.
OXY (Dissolved oxygen)	Units are indicated in the column heading. In the Biological Data section oxygen is reported in milligram-atoms per liter. In the Interpolated and Computed Values oxygen is reported in milliliters per liter.
WATER COLUMN VALUES	Integrated values over the water column from the surface to the bottom of the euphotic zone for CHL-A, LAB-I, and DECK-I. The values at 100 meters and below are not included in this integration because they are below the euphotic zone.
MESSENGER TIME	Messenger time (ship's time, +8 zone) of the productivity cast.
INCOMING SOLAR RADIATION - AM ___ PM ___	Expressed in calories per square centimeter. The AM value is the integrated value of incoming radiation from sunrise to ship's noon; PM represents from ship's noon to sunset.

ZOOPLANKTON — Indicates that zooplankton samples were collected at this station. The information following indicates the type of sampler or net used, the type of tow made, the times of the tow, and the depths sampled, as follows:

(CLARKE-BUMPUS) — Clarke-Bumpus sampler

(HALF-METER NET) — Half-meter net

(MIDWATER, TRAWL) — Midwater trawl

HORIZ — Horizontal tow

VERT — Vertical tow

OBL — Oblique tow

STEP — Stepped tow

TIME (from - to) — Ship's time (+8 zone) of the tow

DEPTHS — Depths sampled

Example: Station 318-6

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0154-0204 DEPTHS 100, 70
0232-0243 30, 0

means that two horizontal tows using Clarke-Bumpus were made. The first tow began at 0154 ship's time, lasted until 0204 and sampled at 70 and 100 meters (two samplers on the wire). The second tow sampled at the surface and 30 meters and lasted from 0232 to 0243 ship's time.

LIGHT SATURATION INCUBATOR ILLUMINATION — Total incubator illumination for light saturation experiments. Expressed in lux.

SP VOL ANOMALY (Specific volume anomaly, $10^5\delta$) — The anomaly of specific volume at the indicated temperature, salinity, and pressure compared to a standard water of 0°C temperature and 35 °/oo salinity, at the same pressure. Tabular values multiplied by 10^{-5} will give the anomaly in units of cubic centimeters per gram.

GEOPOT ANOMALY (Geopotential anomaly, ΣAD) — Geopotential anomaly in dynamic meters of the layer of water between the surface and the indicated depth.

POT ENERGY (Potential energy anomaly)	Potential energy anomaly in units of 10^8 ergs per square centimeter of the layer of water between the surface and the indicated depth.
VAR RATIO (Variance ratio)	The ratio of the variance of the interpolation polynomial to the variance of the measurement. The value of the variance ratio is an indication of the adequacy of the vertical spacing of the observed values upon which the interpolation is based. See page 7 of Volume I. Values close to 1 indicate optimum spacing. Values greater than 3 indicate that the vertical spacing is inadequate to represent faithfully the distribution of properties in this region of the curve. In the case of missing values, where different combinations of observed values may be used to interpolate at the same depth, the variance ratio which indicates the worst spacing has been printed. Values greater than 100 have been printed as 99.99. If the observed depth corresponds to a desired standard depth, no interpolation is made and the variance ratio is not computed.
E(T) (Temperature interpolation error)	Interpolation error, in degrees Celsius, of the temperature value at this depth. For a discussion of the interpolation error, see page 7 of Volume I. If the observed depth corresponds to a desired standard depth, the interpolation error will be zero.
E(S) (Salinity interpolation error)	Interpolation error, in parts per thousand, of the salinity value at this depth. See comments under E(T) above.
E(O) (Oxygen interpolation error)	Interpolation error, in milliliters per liter, of the oxygen value at this depth. See comments under E(T) above.
*	Indicates a questionable value. See page 8 of Volume I.
†	Indicates a hand-interpolated value. See page 8 of Volume I.

Codes Used for Reporting Observations

Taken from National Oceanographic Data Center Publication M-2, "Processing Physical and Chemical Data from Oceanographic Stations," or U.S. Navy Hydrographic Office Publication No. 606-c, "Hydrographic Office Observers Manual, Bathythermograph Observations," or U.S. Navy Hydrographic Office Publication No. 607, "Instruction Manual for Oceanographic Observations."

Cloud Type (taken from NODC Publication M-2) WMO Code 0500

Code		
0	Cirrus	Ci
1	Cirrocumulus	Cc
2	Cirrostratus	Cs
3	Altocumulus	Ac
4	Altostratus	As
5	Nimbostratus	Ns
6	Stratocumulus	Sc
7	Stratus	St
8	Cumulus	Cu
9	Cumulonimbus	Cb
x	Cloud not visible owing to darkness, fog, duststorm, sandstorm, or other analogous phenomena	

Amount of Cloud Cover (taken from NODC Publication M-2) WMO Code 2700

Code		
0	0	0
1	1 okta or less, but not zero	1/10 or less, but not zero
2	2 oktas	2/10 - 3/10
3	3 oktas	4/10
4	4 oktas	5/10
5	5 oktas	6/10
6	6 oktas	7/10 - 8/10
7	7 oktas or more, but not 8 oktas	9/10 or more, but not 10/10
8	8 oktas	10/10
9	Sky obscured, or cloud amount cannot be estimated	

Visibility (taken from NODC Publication M-2) WMO Code 4300

Code		
0	Less than 50 metres	(less than 55 yards)
1	50-200 metres	(approx. 55-220 yards)
2	200-500 metres	(approx. 220-550 yards)
3	500-1,000 metres	(approx. 550 yards-5/8 n.m.)
4	1- 2 km	(approx. 5/8-1 n.m.)

Code

5	2- 4 km	(approx. 1- 2 n.m.)
6	4-10 km	(approx. 2- 6 n.m.)
7	10-20 km	(approx. 6-12 n.m.)
8	20-50 km	(approx. 12-30 n.m.)
9	50 km or more	(30 n.m. or more)

Direction (taken from NODC Publication M-2)
Compass Direction from which Wind, Sea, or Swell is coming

Code

00	Calm, or no value
01 to 36	Each value represents 1/10 of the true direction in degrees, measured clockwise from the north, with 36 representing true north.

State of the Sea - Wind Waves (taken from NODC Publication M-2)
WMO Code 3700

Code	Description	Height (Feet)
0	Calm (Glassy)	0
1	Calm (Rippled)	0 - 1/3
2	Smooth (Wavelets)	1/3 - 1 2/3
3	Slight	1 2/3 - 4
4	Moderate	4 - 8
5	Rough	8 - 13
6	Very Rough	13 - 20
7	High	20 - 30
8	Very High	30 - 45
9	Phenomenal	over 45

Swell Conditions (taken from H.O. 606-c or H.O. 607)

Code	Approx. Height in Feet	Description		Approx. Length in Feet
0	0	No swell		0
1 2	1 - 6	Low swell	Short or average Long	0 - 600 Above 600
3 4 5	6 - 12	Moderate	Short Average Long	0 - 300 300 - 600 Above 600
6 7 8	Greater than 12	High	Short Average Long	0 - 300 300 - 600 Above 600
9	---	Confused		

NUMERICAL WEATHER CODES—PRESENT WEATHER

00	01	02	03	04	05	06	07	08	09
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

Water Color (taken from NODC Publication M-2)

Forel-Ule scale and conversions from per cent yellow and per cent brown scales

Per Cent Yellow	Per Cent Brown	Forel-Ule Scale	Code
0		I	01
2		II	02
5		III	03
9		IV	04
14		V	05
20		VI	06
27		VII	07
35		VIII	08
44		IX	09
54		X	10
65	0	XI	11
	2	XII	12
	5	XIII	13
	9	XIV	14
	14	XV	15
	20	XVI	16
	27	XVII	17
	35	XVIII	18
	44	XIX	19
	54	XX	20
	65	XXI	21

Height of Dominant Waves (taken from NODC Publication M-2) WMO Code 1555

Code	
0	Less than 1/4 m (1 ft)
1	1/2 m (1 1/2 ft)
2	1 m (3 ft)
3	1 1/2 m (5 ft)
4	2 m (6 1/2 ft)
5	2 1/2 m (8 ft)
6	3 m (9 1/2 ft)
7	3 1/2 m (11 ft)
8	4 m (13 ft)
9	4 1/2 m (14 ft)
x	Height not determined

Code	If 50 is added to direction
0	5 m (16 ft)
1	5 1/2 m (17 1/2 ft)
2	6 m (19 ft)
3	6 1/2 m (21 ft)
4	7 m (22 1/2 ft)
5	7 1/2 m (24 ft)
6	8 m (25 1/2 ft)
7	8 1/2 m (27 ft)
8	9 m (29 ft)
9	9 1/2 m (30 1/2 ft)

Period of Dominant Waves (taken from NODC Publication M-2) WMO Code 3155

Code		Code	
2	5 seconds or less	8	16 or 17 seconds
3	6 or 7 seconds	9	18 or 19 seconds
4	8 or 9 seconds	0	20 or 21 seconds
5	10 or 11 seconds	1	Over 21 seconds
6	12 or 13 seconds	x	Calm, or period not determined
7	14 or 15 seconds		

Present Weather (taken from NODC Publication M-2) WMO Code 4501

Code figure	
0	Clear (no cloud at any level)
1	Partly cloudy (scattered or broken)
2	Continuous layer(s) or cloud(s)
3	Sandstorm, duststorm, or blowing snow
4	Fog, thick dust or haze
5	Drizzle
6	Rain
7	Snow, or rain and snow mixed
8	Shower(s)
9	Thunderstorm(s)

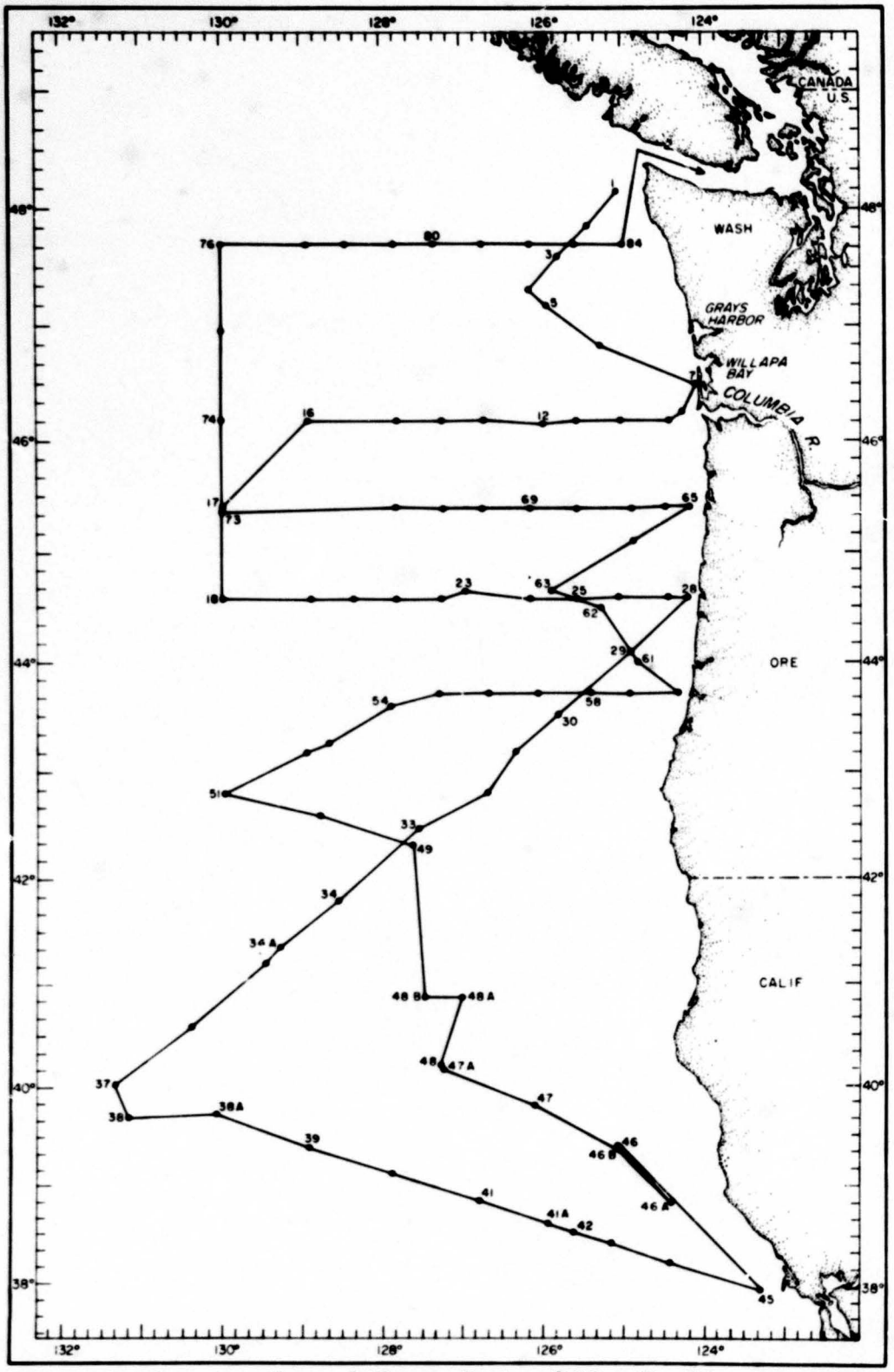

Fig. 1. Station locations Oshawa Cruise 002, 17 – 30 June 1963.

CNAV OSHAWA CRUISE OS2 STATION 001 OBSERVED VALUES

DATE 23/05/64 HR 06.7 LAT 48-10 N LONG 125-04 W SNDG 210 WEA 2 WIND VEL 14 DIR 32
BAROM 23.0 TEMP DRY 12.2 WET 11.1 RELHU 88 WTRCLR SECCI SEA 3 DIR 32 SWELL 1 DIR 27
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADJ	OXYGEN SATN
1	0	12.55	30.548	23.06	8.04	0.718	-0.185	135
1	5	12.55	30.550	23.06	8.00	0.715	-0.181	134
1	10	12.28	30.615	23.34	8.25	0.737	-0.189	134
1	19	9.73	31.058	23.94	6.46	0.577	-0.012	102
1	29	9.21	31.586	24.44	5.40	0.482	0.088	85
1	48	8.81	32.080	24.89	5.02	0.448	0.125	78
1	72	8.30	32.864	25.58	4.26	0.380	0.197	66
1	95	7.98	33.378	26.03	3.38	0.302	0.277	52
1	119	7.63	33.574	26.23	2.96	0.264	0.319	45
1	143	7.12	33.858	26.52	2.51	0.224	0.365	38
1	167	6.98	33.991	26.65	2.43	0.217	0.374	37

CNAV OSHAWA CRUISE OS2 STATION 001 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.47			30.442
5	1.60	0.94		30.473
10	1.01	1.22		30.746
20	0.83	3.30		31.303
100	0.90	0.00		33.453
	23.36	32.70	- WATER COLUMN VALUES	

MESSENGER TIME 2040

CNAV OSHAWA CRUISE 052 STATION 001

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	INTERPOLATED AND COMPUTED VALUES SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.55	0.00	30.548	0.000	23.06	481.7	0.000	0.00	8.04	0.00	
10	11.28	0.00	30.615	0.000	23.34	454.9	0.048	0.02	8.25	0.00	
20	9.69	0.01	31.114	0.003	24.00	392.7	0.090	0.09	8.32	0.01	0.88
30	9.18	0.01	31.61[illegible]	0.006	24.47	347.6	0.128	0.18	5.36	0.02	0.97
50	8.76	0.00	32.147	0.005	24.95	302.7	0.193	0.45	4.97	0.00	0.91
75	8.25	0.00	32.947	0.002	25.65	236.3	0.261	0.87	4.14	0.01	0.83
100	7.91	0.00	33.430	0.012	26.08	196.0	0.315	1.36	3.27	0.01	0.77
150	7.02	0.01	33.723	0.004	26.59	147.8	0.402	2.44	2.43	0.01	5.11

CNAV OSHAWA CRUISE 152 STATION 002 OBSERVED VALUES

DATE 23/05/63 HR 08.7 LAT 47-53 N LONG 125-27 W SNDG 787 WEA 12 WIND VEL 14 DIR 32
BAROM 23.0 TEMP DRY 12.2 WET 11.1 WET BULB WTR CLR SECCHI SEA ST DIR 32 SWELL DIR
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE 20.28

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.59	30.777	23.23	7.49	0.540	-0.128	124
1	5	11.44	31.205	23.77	6.02	0.716	-0.173	132
1	9	11.08	31.163	23.80	5.24	0.647	-0.098	118
1	19	9.67	31.701	24.46	5.92	0.529	0.035	94
1	28	10.06	31.799	24.47	6.25	0.558	0.000	100
1	47	9.50	32.199	24.87	6.04	0.539	0.024	96
1	71	8.69	32.843	25.50	5.13	0.458	0.114	80
1	94	8.01	33.319	25.97	3.95	0.353	0.226	61
1	118	7.83	33.602	26.22	3.54	0.325	0.255	56
1	141	7.64	33.804	26.41	3.08	0.275	0.307	47
1	165	7.42	33.885	26.50	2.81	0.251	0.334	43
2	185	7.28	33.903	26.54	2.61	0.233	0.354	40
2	230	6.89	33.964	26.64	2.33	0.208	0.384	35
2	276	6.38	34.003	26.74	2.04	0.182	0.417	30
2	464	4.96	34.139	27.02	0.72	0.064	0.556	10
2	712	4.28	34.268	27.20	0.67	0.060	0.570	9

CNAV OSHAWA CRUISE OS2 STATION 002 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	1.35	0.85		30.757
5	1.91	2.22		30.785
10	3.49	4.22		31.102
20	7.26	12.03		31.501
100	0.07	0.09		33.232
	75.42	105.02	- WATER COLUMN VALUES	

MESSENGER TIME 0214 INCOMING SOLAR RADIATION - AM 179 PM 242

CNAV OSHAWA CRUISE 052 STATION 002 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	[illegible]	SAL	[illegible]	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY [illegible]	[illegible]	VAR RATIO
0	12.59	0.00	30.[illegible]77	0.000	23.23	465.6	0.000	0.00	[illegible]	0.00	
10	10.91	0.04	31.206	0.021	23.86	405.1	0.044	0.02	[illegible]	0.01	1.00
20	9.69	0.03	31.719	0.007	24.47	347.7	0.082	0.08	[illegible]	0.03	0.85
30	10.07	0.03	31.833	0.003	24.49	345.4	0.117	0.17	[illegible]	0.01	0.96
50	9.40	0.00	32.279	0.006	24.95	302.3	0.182	0.43	[illegible]	0.01	0.86
75	8.55	0.01	32.938	0.001	25.60	241.2	0.251	0.86	[illegible]	0.03	0.78
100	7.94	0.02	33.403	0.005	26.05	198.3	0.306	1.35	3.84	0.04	0.73
150	7.56	0.00	33.846	0.003	26.45	160.9	0.397	2.49	[illegible]	0.01	0.68
200	7.16	0.00	33.923	0.002	26.57	150.5	0.475	3.89	[illegible]	0.01	0.91
250	6.67	0.01	33.983	0.001	26.68	140.2	0.549	5.58	[illegible]	0.00	0.61
300	6.15	0.01	34.022	0.000	26.78	131.2	0.617	7.51	[illegible]	0.02	1.21
400	5.34	0.01	34.097	0.000	26.94	116.8	0.742	11.97	1.12	0.05	1.13
500	4.79	0.00	34.161	0.000	27.06	106.6	0.855	17.16	0.81	0.14	60.08
600	4.46	0.01	34.216	0.000	27.14	99.6	0.953	23.04	0.62	0.11	65.08
700	4.29	0.00	34.263	0.000	27.19	95.1	1.057	29.60	0.65	0.02	99.99

CNAV OSHAWA CRUISE OS2 STATION 003 OBSERVED VALUES

DATE 23/05/63 HR 13.4 LAT 47-36 N LONG 125-49 W SNDG 786 WEA 03 WIND VEL 15 DIR 33
BAROM 21.0 TEMP DRY 11.7 WET 10.0 RELHU 81 WTRCLR SECDI SEA 2 DIR 33 SWEL 1 DIR 27
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.92	31.676	23.86	6.28	0.561	-0.036	107
1	5	12.90	31.674	23.86	6.25	0.558	-0.033	106
1	10	12.92	31.677	23.86	6.27	0.560	-0.035	107
1	20	12.64	31.775	23.99	6.40	0.572	-0.044	108
1	30	11.26	32.055	24.46	6.61	0.590	-0.048	109
1	50	9.85	32.272	24.87	6.20	0.554	0.005	99
1	75	9.12	32.797	25.40	5.21	0.465	0.101	82
1	100	8.45	33.325	25.91	4.09	0.365	0.208	64
1	125	8.00	33.662	26.25	3.72	0.332	0.246	57
1	150	7.86	33.864	26.42	2.63	0.235	0.344	41
1	175	7.57	33.903	26.50	2.64	0.236	0.347	40

CNAV OSHAWA CRUISE OS2 STATION 003 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.12	0.24	2.26	31.667
5	0.12	0.21		31.666
10	0.12	0.20		31.668
20	0.12	0.27		31.725
	2.39	4.50	- WATER COLUMN VALUES	

MESSENGER TIME 0435 INCOMING SOLAR RADIATION - AM 179 PM 242

CNAV OSHAWA CRUISE 052 STATION 003 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E T	SAL	E S	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E O	VAR RATIO
0	12.92	0.00	31.675	0.000	23.86	405.3	0.000	0.00	6.28	0.00	
10	12.92	0.00	31.677	0.000	23.86	405.2	0.041	0.04	6.27	0.00	
20	12.64	0.00	31.775	0.000	23.99	393.4	0.082	0.08	6.40	0.00	
30	11.26	0.00	32.055	0.000	24.46	348.6	0.119	0.18	6.61	0.00	
50	9.65	0.00	32.272	0.000	24.87	309.8	0.185	0.45	6.20	0.00	
75	9.12	0.00	32.797	0.000	25.40	260.1	0.257	0.90	5.21	0.00	
100	8.45	0.00	33.325	0.000	25.91	211.4	0.316	1.43	4.09	0.00	
150	7.86	0.00	33.864	0.000	26.42	163.8	0.411	2.61	2.63	0.00	

CNAV OSHAWA CRUISE OS2 STATION 004 OBSERVED VALUES

DATE 23/05/63 HR 16.1 LAT 47-20 N LONG 126-10 W SNDG 1920 WEA 02 WIND VEL 20 DIR 29
BAROM 20.0 TEMP DRY 12.2 WET 11.1 RELHU 88 WTRCLR SECCI SEA 3 DIR 29 SWELL 2 DIR 27
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 9,28

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	12.71	31.859	24.04	6.26	0.559	-0.032	106
1	5	12.69	31.851	24.04	6.26	0.559	-0.032	106
1	10	12.70	31.859	24.04	6.25	0.558	-0.031	106
1	20	11.02	32.442	24.80	6.76	0.604	-0.060	111
1	30	10.13	32.469	24.98	6.84	0.611	-0.056	110
1	50	9.59	32.498	25.09	6.47	0.578	-0.016	103
1	74	8.53	32.889	25.56	5.17	0.462	0.112	80
1	99	7.96	33.304	25.97	4.36	0.389	0.190	67
1	124	7.69	33.598	26.24	3.95	0.353	0.230	61
1	149	7.55	33.829	26.44	3.19	0.285	0.298	49
1	173	7.18	33.901	26.55	3.08	0.275	0.313	47
2	265	6.36	33.995	26.73	2.03	0.181	0.418	30
2	439	5.23	34.090	26.95	0.96	0.086	0.530	14
2	657	4.31	34.227	27.16	0.36	0.032	0.598	5
2	875	3.73	34.369	27.33	0.32	0.029	0.610	4
2	1325	2.76	34.517	27.54	0.56	0.050	0.604	8
2	1606	2.38	34.567	27.61	0.91	0.081	0.079	12

CNAV OSHAWA CRUISE 052 STATION 004 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.06	0.17		31.878
5	0.04	0.22		31.880
10	0.05	0.24		31.907
20	0.12	0.29		32.210
100	0.05	0.10		33.206
	1.36	4.73	- WATER COLUMN VALUES	

MESSENGER TIME 0858 INCOMING SOLAR RADIATION - AM 179 PM 242

CNAV OSHAWA CRUISE 052 STATION 004 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.71	0.00	31.859	0.000	24.04	388.0	0.000	0.00	6.26	0.00	
10	12.70	0.00	31.859	0.000	24.04	388.0	0.040	0.02	6.25	0.00	
20	11.02	0.00	32.442	0.000	24.80	315.7	0.075	0.07	6.76	0.00	
30	10.13	0.00	32.469	0.000	24.98	299.3	0.106	0.15	6.84	0.00	
50	9.59	0.00	32.498	0.000	25.09	289.0	0.165	0.39	6.47	0.00	
75	8.50	0.00	32.907	0.001	25.58	242.8	0.232	0.82	5.13	0.00	0.94
100	7.95	0.00	33.318	0.000	25.98	204.8	0.289	1.32	4.34	0.00	0.94
150	7.54	0.00	33.834	0.001	26.45	161.5	0.381	2.47	3.18	0.00	0.95
200	6.88	0.03	33.945	0.009	26.63	145.1	0.458	3.85	2.11	0.05	1.31
250	6.46	0.02	33.991	0.006	26.72	136.8	0.529	5.49	2.22	0.03	0.87
300	6.10	0.01	34.018	0.003	26.79	130.9	0.597	7.39	1.75	0.02	0.89
400	5.44	0.01	34.073	0.003	26.91	119.9	0.723	11.92	1.12	0.02	0.76
500	4.93	0.01	34.127	0.000	27.01	110.7	0.840	17.28	0.72	0.01	0.75
600	4.51	0.01	34.190	0.000	27.11	102.1	0.947	23.33	0.45	0.01	0.73
700	4.18	0.01	34.257	0.001	27.20	94.3	1.046	29.95	0.33	0.01	0.77
800	3.91	0.01	34.322	0.002	27.28	87.1	1.138	37.01	0.30	0.02	0.61
1000	3.42	0.00	34.424	0.004	27.41	75.7	1.303	52.15	0.35	0.00	0.92
1200	2.99	0.00	34.490	0.004	27.50	67.2	1.448	68.45	0.45	0.00	0.87
1500	2.50	0.00	34.549	0.001	27.59	59.0	1.640	94.97	0.76	0.00	0.95

CNAV OSHAWA CRUISE OS2 STATION 005 OBSERVED VALUES

DATE 23/05/63 HR 19.5 LAT 47-12 N LONG 125-57 W SNDG 1550 WEA 02 WIND VEL 18 DIR 32
BAROM 21.0 TEMP DRY 14.4 WET 12.2 RELHU 77 WTRCLR SECCI SEA 2 DIR 32 SWELL 2 DIR 29
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 26

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	12.89	31.714	23.89	6.40	0.572	-0.046	109
1	5	12.89	31.726	23.90	6.50	0.581	-0.055	111
1	9	12.90	31.710	23.89	6.44	0.575	-0.050	110
1	18	11.36	32.325	24.65	6.81	0.608	-0.068	113
1	27	10.15	32.310	24.85	6.84	0.611	-0.056	110
1	45	9.65	32.429	25.03	6.85	0.612	-0.051	109
1	69	9.05	32.702	25.33	5.61	0.501	0.067	88
1	90	8.17	33.273	25.92	4.32	0.386	0.191	67
1	113	7.89	33.606	26.22	3.70	0.330	0.249	57
1	135	7.65	33.799	26.40	3.16	0.282	0.300	48
1	158	7.49	33.853	26.47	3.04	0.272	0.313	46
1	180	7.31	33.900	26.53	2.87	0.256	0.330	44
1	280	5.82	33.954	26.77	2.36	0.211	0.397	35

CNAV OSHAWA CRUISE OS2 STATION 005 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	IRRAD	SAL
0	0.08	0.26		0.32	100		31.668
				0.28	59		
				0.34	47		
				0.38	33		
				0.09	18		
				0.03	6		
13	0.11	0.18				50	31.762
22	0.17	0.25				10	32.308
57	0.17	0.17				1	32.460
100	0.10	0.03					33.171
150	0.07						33.385
200	0.10						33.697
	8.36	11.49	- WATER COLUMN VALUES				

MESSENGER TIME 1142 INCOMING SOLAR RADIATION - AM 179 PM 242

LIGHT SATURATION INCUBATOR ILLUMINATION 21100

CNAV OSHAWA CRUISE OS2 STATION 005 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.89	0.00	31.714	0.000	23.89	402.0	0.000	0.00	6.40	0.00	
10	12.77	0.04	31.772	0.025	23.96	395.8	0.041	0.02	6.47	0.02	0.97
20	11.05	0.01	32.347	0.019	24.72	323.3	0.077	0.07	6.83	0.01	0.75
30	9.98	0.06	32.320	0.003	24.89	307.9	0.109	0.16	6.87	0.02	0.93
50	9.54	0.01	32.464	0.007	25.07	290.8	0.159	0.40	6.66	0.03	0.81
75	8.79	0.03	32.862	0.019	25.50	250.3	0.237	0.83	5.22	0.03	0.68
100	8.00	0.03	33.445	0.007	26.07	196.1	0.293	1.33	4.00	0.03	0.66
150	7.54	0.00	33.843	0.005	26.45	160.9	0.383	2.46	3.06	0.02	0.68
200	7.11	0.00	33.936	0.001	26.59	148.9	0.461	3.66	2.70	0.01	31.88
250	6.42	0.01	33.962	0.002	26.70	138.5	0.534	5.53	2.36	0.03	73.75

CNAV OSHAWA CRUISE OS2 STATION 006 OBSERVED VALUES

DATE 23/05/63 HR 23.4 LAT 46-51 N LONG 125-17 W SNDG 1554 WEA 03 WIND VEL 22 DIR 33
BAROM 21.0 TEMP DRY 14.4 WET 11.1 REL HU 67 WIRCLR SEC01 SEA 2 DIR 32 SWELL 2 DIR 29
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE'S 12.--

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN S A N
1	0	12.88	31.414	23.67	6.41	0.573	-0.046	109
1	5	12.54	31.417	23.68	6.41	0.573	-0.046	109
1	10	12.37	31.663	23.95	6.59	0.589	-0.057	111
1	20	11.98	31.979	24.42	6.73	0.601	-0.057	110
1	29	10.[illegible]	32.261	24.71	6.74	0.602	-0.054	110
1	49	10.12	32.387	24.92	6.41	0.573	-0.017	103
1	74	9.52	32.585	25.17	5.33	0.476	0.086	85
1	98	8.94	33.204	25.75	4.37	0.390	0.177	69
1	123	8.15	33.627	26.20	3.24	0.289	0.287	50
1	147	7.88	33.814	26.38	2.60	0.232	0.347	40
2	181	7.34	33.930	26.55	2.45	0.219	0.367	37
2	228	6.68	33.961	26.67	2.41	0.215	0.380	36
2	276	6.29	33.989	26.74	2.03	0.181	0.419	30
2	470	5.10	34.096	26.97	0.91	0.081	0.537	13
2	710	4.24	34.281	27.21	0.36	0.032	0.598	5
2	936	3.67	34.377	27.35	0.39	0.035	0.605	5

CNAV OSHAWA CRUISE 052 STATION 006 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.16	0.28		31.473
13	0.19	0.44		31.413
22	0.24	0.41		31.758
57	0.58	0.24		32.406
100	0.05	0.03		33.093
	18.58	19.80	- WATER COLUMN VALUES	

MESSENGER TIME 1542 INCOMING SOLAR RADIATION - AM 179 PM 242

CNAV OSHAWA CRUISE OS2 STATION 006 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.86	0.00	31.414	0.000	23.67	423.5	0.000	0.00	6.41	0.00	
10	12.37	0.00	31.663	0.000	23.95	396.5	0.042	0.02	6.59	0.00	
20	11.18	0.00	31.979	0.000	24.42	352.6	0.080	0.08	6.73	0.00	
30	10.73	0.00	32.275	0.006	24.72	323.4	0.114	0.16	6.73	0.00	0.99
50	10.09	0.00	32.390	0.003	24.92	305.0	0.177	0.42	6.37	0.01	0.95
75	9.50	0.00	32.609	0.004	25.19	279.8	0.251	0.89	5.29	0.00	0.94
100	8.87	0.01	33.248	0.000	25.79	223.4	0.314	1.45	4.27	0.01	0.89
150	7.84	0.00	33.829	0.001	26.40	166.0	0.412	2.67	2.57	0.01	0.92
200	7.05	0.01	33.952	0.006	26.61	146.9	0.491	4.08	2.[illegible]	0.02	0.71
250	6.48	0.01	33.974	0.000	26.70	138.4	0.563	5.74	2.25	0.02	0.60
300	6.11	0.00	34.001	0.001	26.77	132.3	0.631	7.66	1.86	0.00	1.19
400	5.47	0.01	34.056	0.002	26.89	121.4	0.759	12.24	1.24	0.00	1.15
500	4.97	0.01	34.120	0.003	27.00	111.7	0.877	17.66	0.80	0.01	0.86
600	4.58	0.02	34.198	0.006	27.11	102.3	0.985	23.75	0.52	0.01	0.68
700	4.27	0.00	34.274	0.001	27.20	94.0	1.084	30.36	0.37	0.00	0.94
800	4.01	0.01	34.336	0.003	27.28	87.3	1.176	37.42	0.27	0.03	5.81

CNAV OSHAWA CRUISE OS2 STATION 007 OBSERVED VALUES

NAHCOTTA

DATE 24/05/63 HR 04.1 LAT 46-31 N LONG 124-41 W SNDG 475 WEA 02 WIND VEL 26 DIR 32
BAROM 18.0 TEMP DRY 12.8 WET 10.6 RELHU 76 WTRCLR SECDI SEA 3 DIR 32 SWELL 2 DIR 29
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 27,30

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	13.77	29.774	22.23	6.33	0.565	-0.043	108
1	5	13.77	29.768	22.22	6.36	0.568	-0.045	109
1	10	13.77	29.790	22.24	6.37	0.569	-0.046	109
1	19	11.59	30.702	23.35	6.62	0.591	-0.047	109
1	28	10.39	32.252	24.77	6.78	0.606	-0.053	110
1	46	9.59	32.535	25.12	5.72	0.511	0.051	91
1	69	8.81	33.016	25.62	4.80	0.429	0.141	75
1	92	8.39	33.434	26.01	3.66	0.327	0.247	57
1	115	7.93	33.772	26.34	2.96	0.264	0.314	46
1	138	7.70	33.858	26.44	2.46	0.220	0.361	38
1	161	7.43	33.912	26.52	2.36	0.211	0.374	36
1	185	7.05	33.940	26.60	2.53	0.226	0.364	38
1	231	6.52	33.961	26.69	2.40	0.214	0.383	36
1	277	6.05	33.993	26.77	1.95	0.174	0.430	29

CNAV OSHAWA CRUISE OS2 STATION 007 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.24	0.26		29.813
13	0.21	0.11		29.921
22	0.49	0.29		32.214
57	0.11	0.04		32.755
100	0.06	0.00		33.512
	16.59	10.60	- WATER COLUMN VALUES	

MESSENGER TIME 2029 INCOMING SOLAR RADIATION - AM 179 PM 242

CNAV OSHAWA CRUISE OS2 STATION 007 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.77	0.00	29.774	0.000	22.23	561.3	0.000	0.00	6.33	0.00	
10	13.77	0.00	29.790	0.000	22.24	560.2	0.057	0.03	6.37	0.00	
20	11.42	0.01	30.882	0.026	23.52	437.7	0.107	0.10	6.65	0.01	0.66
30	10.24	0.03	32.374	0.063	24.89	308.2	0.145	0.20	6.70	0.04	0.95
50	9.43	0.00	32.616	0.005	25.21	277.8	0.204	0.44	5.55	0.02	0.82
75	8.69	0.01	33.132	0.001	25.73	228.8	0.268	0.84	4.49	0.02	0.72
100	8.22	0.01	33.570	0.007	26.14	189.9	0.320	1.31	3.38	0.01	0.67
150	7.57	0.00	33.890	0.000	26.49	157.8	0.408	2.41	2.37	0.01	0.64
200	6.86	0.01	33.949	0.002	26.63	144.5	0.484	3.77	2.54	0.01	0.84
250	6.33	0.00	33.969	0.001	26.72	136.8	0.555	5.41	2.23	0.01	12.22

CNAV OSHAWA CRUISE OS2 STATION 008 OBSERVED VALUES

COLUMBIA RIVER ENTRANCE

DATE 24/05/63 HR 07.1 LAT 46-16 N LONG 124-16 W SNDG 71 WEA 02 WIND VEL 20 DIR 33
BAROM 18.0 TEMP DRY 12.2 WET 10.0 RELHU 76 WTRCLR SECDI SEA 2 DIR 33 SWELL 2 DIR 30
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.79	26.977	20.07	6.59	0.589	-0.056	110
1	5	13.73	27.952	20.83	6.63	0.592	-0.063	112
1	10	13.32	30.431	22.82	6.64	0.593	-0.068	113
1	20	11.42	31.409	23.93	6.88	0.614	-0.071	113
1	30	10.19	30.611*	23.52	6.65	0.594	-0.033	106
1	49	9.06	33.226	25.74	3.61	0.322	0.243	57

CNAV OSHAWA CRUISE OS2 STATION 008 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.88	1.08		26.680
2	0.77	0.59		27.844
4	0.66	0.82		28.282
8	0.42	0.45		30.194
60	0.45	0.27		33.398
	5.24	5.62	- WATER COLUMN VALUES	

MESSENGER TIME 2318 INCOMING SOLAR RADIATION - AM 179 PM 242

CNAV OSHAWA CRUISE 052 STATION 008 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.79	0.00	26.977	0.000	20.07	767.8	0.000	0.00	6.59	0.00	
10	13.32	0.00	30.431	0.000	22.82	504.6	0.065	0.03	6.64	0.00	
20	11.42	0.00	31.409	0.000	23.93	398.8	0.110	0.09	6.88	0.00	
30	10.19	0.00	33.867	1.107	26.06	196.9	0.140	0.17	6.65	0.00	2.34

CNAV OSHAWA CRUISE OS2 STATION 009 OBSERVED VALUES

DATE 24/05/63 HR 08.6 LAT 46-12 N LONG 124-26 W SNDG 128 WEA 02 WIND VEL 18 DIR 33
BAROM 19.0 TEMP DRY . WET . RELHU WTRCLR SECDI SEA 2 DIR 33 SWELL 2 DIR 30
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.88	25.736	19.10	6.33	0.565	-0.030	106
1	5	13.80	29.187	21.77	6.63	0.592	-0.068	113
1	10	11.89	30.555	23.19	6.70	0.598	-0.058	111
1	19	10.90	31.982	24.47	6.68	0.597	-0.049	109
1	29	10.56	32.253	24.74	6.65	0.594	-0.044	108
1	48	9.67	32.470	25.05	6.09	0.544	0.017	97
1	73	8.41	33.554	26.10	2.95	0.263	0.309	46
1	97	7.96	33.713	26.29	2.80	0.250	0.328	43
1	121	7.13	33.928	26.58	2.17	0.194	0.395	33

CNAV OSHAWA CRUISE 052 STATION 009 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.88	0.00	25.736	0.000	19.10	861.1	0.000	0.00	6.33	0.00	
10	11.89	0.00	30.555	0.000	23.19	469.8	0.068	0.02	6.70	0.00	
20	10.85	0.01	32.043	0.019	24.52	342.4	0.108	0.08	6.68	0.00	0.88
30	10.52	0.00	32.263	0.008	24.75	320.9	0.142	0.17	6.65	0.01	0.97
50	9.56	0.01	32.557	0.023	25.14	284.1	0.203	0.42	5.83	0.07	0.91
75	8.37	0.01	33.583	0.012	26.13	190.7	0.263	0.78	2.89	0.04	0.88
100	7.90	0.01	33.718	0.006	26.30	174.4	0.309	1.20	2.20	0.36	5.08

CNAV OSHAWA CRUISE OS2 STATION 010 OBSERVED VALUES

DATE 24/05/63 HR 11.9 LAT 46-12 N LONG 125-02 W SNDG 1316 WEA 03 WIND VEL 25 DIR 32
BAROM 19.0 TEMP DRY 12.2 WET 10.0 RELHU 76 WTRCLR SECCI SEA 2 DIR 33 SWELL 2 DIR 45
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 23.23

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	SATN
1	0	13.56	29.252	21.87	6.23	0.556	-0.030	106
1	5	13.55	29.251	21.87	6.24	0.557	-0.031	106
1	9	12.20	32.040	24.18	6.34	0.566	-0.040	108
1	18	11.[illegible]	32.356	24.61	6.56	0.586	-0.050	109
1	27	10.35	32.379	24.87	6.82	0.609	-0.057	110
1	46	9.65	32.464	25.05	6.32	0.564	-0.003	101
2	69	8.81	33.029	25.63	4.76	0.425	0.144	75
2	93	8.36	33.357	25.95	4.13	0.369	0.205	64
2	115	7.76	33.593	26.23	3.94	0.352	0.230	61
2	139	7.66	33.803	26.41	3.19	0.285	0.297	49
2	165	7.36	33.897	26.52	2.95	0.263	0.322	45
2	186	7.13	33.928	26.58	2.58	0.230	0.358	39
2	233	6.57	33.960	26.68	2.40	0.214	0.382	36
2	280	6.19	33.977	26.74	2.03	0.181	0.421	30

CNAV OSHAWA CRUISE OS2 STATION 010 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.30	0.84	13.66	29.196
5	0.29	0.83		29.222
10	0.34	0.71		31.983
	6.45	11.58	- WATER COLUMN VALUES	

MESSENGER TIME 0420 INCOMING SOLAR RADIATION - AM 138 PM 214

CNAV OSHAWA CRUISE 052 STATION 010 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.56	0.00	29.252	0.000	21.87	595.7	0.000	0.00	6.23	0.00	
10	12.57	0.03	32.286	0.131	24.40	354.2	0.048	0.02	6.36	0.00	0.97
20	11.40	0.03	32.373	0.009	24.68	327.2	0.083	0.07	6.63	0.01	0.75
30	10.14	0.07	32.379	0.007	24.91	306.1	0.115	0.15	6.81	0.02	0.94
50	9.49	0.01	32.553	0.018	25.15	283.4	0.174	0.39	6.05	0.05	0.82
75	8.69	0.02	33.127	0.006	25.72	229.2	0.239	0.80	4.53	0.02	0.74
100	8.15	0.02	33.438	0.001	26.05	198.8	0.292	1.28	4.08	0.03	0.67
150	7.54	0.01	33.855	0.003	26.46	160.0	0.383	2.41	3.07	0.03	0.68
200	6.96	0.01	33.941	0.001	26.61	146.4	0.460	3.79	2.49	0.04	0.92
250	6.40	0.01	33.966	0.001	26.71	137.9	0.532	5.45	2.34	0.02	16.74

CNAV OSHAWA CRUISE 052 STATION 011 OBSERVED VALUES

DATE 24/05/63 HR 15.6 LAT 46-12 N LONG 125-35 W SNDG 2296 WEA 03 WIND VEL 30 DIR 33
BAROM 20.0 TEMP DRY 11.1 WET 9.4 RELHU 81 WTRCLR SECCI SEA 3 DIR 33 SWELL 3 DIR 31
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 1.32

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADJ	OXYGEN SATN
2	0	13.53	29.596	22.14	6.16	0.550	-0.024	105
2	4	13.51	29.596	22.14	6.17	0.551	-0.025	105
2	9	13.48	29.717	22.24	6.20	0.554	-0.028	105
2	17	10.76	32.230	24.68	6.69	0.598	-0.049	109
2	26	10.52	32.322	24.80	6.57	0.587	-0.036	107
2	43	10.28	32.326	24.84	6.63	0.592	-0.039	107
2	64	9.67	32.396	25.00	5.66	0.506	0.055	90
2	85	8.93	32.594	25.27	4.95	0.442	0.128	78
2	106	8.02	33.374	26.02	3.83	0.342	0.237	59
2	128	7.84	33.720	26.31	3.35	0.299	0.281	52
2	149	7.62	33.861	26.46	2.89	0.258	0.324	44
1	196	7.16	33.931	26.58	2.58	0.230	0.358	39
1	244	6.52	33.971	26.69	2.17	0.194	0.403	32
1	293	6.10	33.987	26.76	1.95	0.174	0.429	29
1	492	5.05	34.120	26.99	0.75	0.067	0.552	11
1	741	4.14	34.253	27.20	0.24	0.021	0.611	3
1	991	3.48	34.429	27.41	0.36	0.032	0.610	5
1	1491	2.57	34.529	27.57	0.73	0.065	0.592	10
1	1789	2.14	34.572	27.64	1.18	0.105	0.559	16

CNAV OSHAWA CRUISE OS2 STATION 011 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.28	0.74		29.617
5	0.27	0.79		29.612
10	0.24	0.48		29.614
20	0.27	0.55		29.924
	5.21	12.14	- WATER COLUMN VALUES	

MESSENGER TIME 0811 INCOMING SOLAR RADIATION - AM 138 PM 214

CNAV OSHAWA CRUISE 052 STATION 011 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMAL	POT ENERGY	OXY ML/L	PO	VAR RATIO
0	13.53	0.00	29.595	0.000	22.14	569.8	0.000	0.00	6.16	0.	
10	13.27	0.10	30.016	0.094	22.53	532.4	0.056	0.03	6.27	0.02	0.90
20	10.51	0.11	32.425	0.105	24.88	308.5	0.098	0.09	5.65	0.03	0.68
30	10.46	0.02	32.331	0.008	24.81	314.9	0.130	0.17	5.60	0.03	0.88
50	10.10	0.01	32.338	0.002	24.86	308.9	0.183	0.43	5.36	0.05	0.
75	9.30	0.00	32.455	0.019	25.10	288.2	0.268	0.91	5.30	0.04	0.64
100	8.25	0.03	33.144	0.035	25.80	222.0	0.332	1.47	4.14	0.04	0.70
150	7.61	0.	33.964	0.001	26.46	160.3	0.428	2.67	3.84	0.00	0.69
200	7.11	0.01	33.935	0.000	26.59	148.8	0.506	4.05			0.89
250	6.46	0.00	33.973	0.001	26.70	138.2	0.579	5.73			0.86
300	6.05	0.00	33.991	0.001	26.77	132.3	0.647	7.65			1.
400	5.45	0.03	34.053	0.006	26.89	121.4	0.775	12.23			
500	5.02	0.00	34.124	0.000	27.00	112.0	0.893	17.65	0.72	0.	
600	4.61	0.01	34.177	0.003	27.09	104.3	1.002	23.81	0.42	0.02	0.
700	4.27	0.00	34.231	0.00	27.17	97.2	1.104	30.60	0.26	0.01	0.
800	3.97	0.00	34.296	0.004	27.25	89.8	1.198	37.87	0.24	0.02	0.74
1000	3.46	0.00	34.432	0.001	27.41	75.5	1.365	53.21	0.36	0.00	0.99
1200	3.05	0.01	34.493	0.012	27.50	67.7	1.510	69.55	0.47	0.01	0.90
1500	2.56	0.00	34.530	0.000	27.57	61.1	1.706	96.64	0.74	0.00	12.79

CNAV OSHAWA CRUISE OS2 STATION 012 OBSERVED VALUES

DATE 24/05/63 HR 19.6 LAT 46-10 N LONG 126-00 W SNDG 2377 WEA 02 WIND VEL 22 DIR 33
BAROM 23.0 TEMP DRY 11.7 WET 8.3 RELHU 63 WTRCLR SECDI SEA 3 DIR 33 SWELL 3 DIR 31
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.96	31.552	23.76	6.27	0.560	-0.035	107
1	5	12.96	31.540	23.75	6.36	0.568	-0.043	108
1	10	12.97	31.542	23.75	6.28	0.561	-0.036	107
1	20	10.95	32.392	24.78	6.89	0.615	-0.070	113
1	30	10.58	32.841•	25.19	5.81•	0.519	0.029	95
1	50	9.88	32.528	25.07	6.54	0.584	-0.026	105
1	75	9.23	32.608	25.23	6.23	0.556	0.009	98
1	99	8.28	33.322	25.94	4.19	0.374	0.201	65
1	124	7.98	33.689	26.27		0.000	0.578	0
1	148	7.77	33.856	26.43	3.00	0.268	0.312	46
1	172	7.53	33.910	26.51	2.79	0.249	0.334	43
1	197	7.29	33.948	26.57	2.59	0.231	0.355	39
1	248	6.63	33.979	26.69	2.22	0.198	0.397	33

CNAV OSHAWA CRUISE OS2 STATION 012 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	IRRAD	SAL
0	0.09	0.18	1.00				31.522
8	0.06	0.23	1.34	0.21	100	50	31.517
				0.17	59		
				0.11	47		
				0.12	33		
				0.03	18		
				0.00	6		
22	0.10	0.13	0.00			10	32.342
49	0.14	0.09				1	32.500
100	0.05	0.00					33.300
150							33.852
200	0.01						33.941
	4.84	7.06	18.74	- WATER COLUMN VALUES			

MESSENGER TIME 1150 INCOMING SOLAR RADIATION - AM 138 PM 214

LIGHT SATURATION INCUBATOR ILLUMINATION 19800

CNAV OSHAWA CRUISE OS2 STATION 012 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.96	0.00	31.552	0.000	23.76	415.2	0.000	0.00	6.27	0.00	
10	12.97	0.00	31.542	0.000	23.75	416.4	0.042	0.02	6.28	0.00	
20	10.95	0.00	32.392	0.000	24.78	318.3	0.079	0.08	6.89	0.00	
30	10.58	0.00	32.641	0.132	25.04	293.9	0.110	0.16	6.96	0.12	1.10
50	9.88	0.00	32.528	0.000	25.07	291.4	0.169	0.40	6.54	0.00	
75	9.23	0.00	32.608	0.000	25.23	275.8	0.241	0.85	6.23	0.00	
100	8.26	0.00	33.342	0.001	25.96	207.4	0.301	1.39	4.14	0.01	0.99
150	7.75	0.00	33.863	0.001	26.44	162.3	0.395	2.56	2.98	0.00	0.89
200	7.26	0.00	33.951	0.000	26.58	149.7	0.473	3.96	2.57	0.00	6.83

CNAV OSHAWA CRUISE OS2 STATION 013 OBSERVED VALUES

DATE 24/05/63 HR 23.9 LAT 46-12 N LONG 126-44 W SNDG 2743 WEA 03 WIND VEL 26 DIR 33
BAROM 24.0 TEMP DRY 11.1 WET 9.4 RELHU 81 WTRCLR SECDI SEA 3 DIR 35 SWELL 3 DIR 32
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 12,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.13	32.483	24.63	6.45	0.576	-0.045	108
1	5	12.10	32.482	24.64	6.46	0.577	-0.046	109
1	10	12.11	32.479	24.63	6.46	0.577	-0.046	109
1	20	12.02	32.494	24.66	6.44	0.575	-0.043	108
1	29	10.90	32.564	24.92	6.78	0.606	-0.060	111
1	49	9.99	32.544	25.06	6.59	0.589	-0.032	106
1	74	9.85	32.542	25.08	6.51	0.581	-0.023	104
1	98	8.55	33.297	25.88	4.37	0.390	0.182	68
1	123	8.33	33.591	26.14	3.74	0.334	0.240	58
1	147	8.16	33.838	26.36	2.96	0.264	0.311	46
1	172	7.74	33.916	26.48	2.81	0.251	0.329	43
2	198	7.40	33.954	26.56	2.55	0.228	0.357	39
2	247	6.80	33.984	26.67	2.27	0.203	0.390	34
2	297	6.30	34.004	26.75	1.98	0.177	0.424	29
2	496	5.06	34.124	27.00	0.82	0.073	0.545	12
2	742	4.18	34.286	27.22	0.25	0.022	0.609	4
2	990	3.54	34.409	27.38	0.38	0.034	0.607	5
2	1486	2.53	34.535	27.58	0.75	0.067	0.591	10
2	1781	2.11	34.575	27.64	1.16	0.104	0.561	16

CNAV OSHAWA CRUISE OS2 STATION 013 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.16	0.40		32.464
8	0.13	0.41		32.461
22	0.15	0.26		32.471
49	0.33	0.34		32.550
	9.71	16.00	- WATER COLUMN VALUES	

MESSENGER TIME 1519 INCOMING SOLAR RADIATION - AM 138 PM 214

CNAV OSHAWA CRUISE OS2 STATION 013 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.13	0.00	32.483	0.000	24.63	331.6	0.000	0.00	6.45	0.00	
10	12.11	0.00	32.479	0.000	24.63	331.7	0.034	0.02	6.46	0.00	
20	12.02	0.00	32.494	0.000	24.66	329.2	0.067	0.07	6.44	0.00	
30	10.82	0.01	32.566	0.002	24.94	303.4	0.099	0.15	6.78	0.01	0.99
50	9.99	0.02	32.536	0.005	25.05	292.4	0.159	0.40	6.61	0.02	0.95
75	9.80	0.01	32.571	0.008	25.11	287.3	0.232	0.86	6.43	0.02	0.94
100	8.51	0.01	33.330	0.006	25.91	211.9	0.295	1.42	4.29	0.02	0.89
150	8.11	0.01	33.853	0.003	26.38	168.2	0.391	2.62	2.93	0.01	0.85
200	7.37	0.00	33.956	0.000	26.57	151.0	0.471	4.05	2.54	0.00	0.98
250	6.77	0.00	33.985	0.000	26.67	141.3	0.545	5.75	2.25	0.00	0.93
300	6.28	0.00	34.006	0.000	26.75	134.1	0.614	7.71	1.96	0.00	1.02
400	5.55	0.03	34.061	0.002	26.89	122.1	0.744	12.32	1.34	0.03	1.28
500	5.04	0.00	34.127	0.000	27.00	112.1	0.862	17.77	0.80	0.00	0.98
600	4.63	0.02	34.194	0.002	27.10	103.2	0.971	23.90	0.48	0.01	0.68
700	4.30	0.01	34.259	0.001	27.19	95.5	1.071	30.59	0.29	0.01	0.79
800	4.02	0.00	34.318	0.000	27.26	88.7	1.164	37.75	0.25	0.02	0.74
1000	3.52	0.00	34.413	0.000	27.39	77.6	1.332	53.22	0.38	0.00	0.99
1200	3.07	0.00	34.477	0.004	27.48	69.1	1.481	69.96	0.50	0.01	0.90
1500	2.51	0.00	34.537	0.000	27.58	59.9	1.677	97.04	0.77	0.00	12.66

CNAV OSHAWA CRUISE OS2 STATION 014 OBSERVED VALUES

DATE 25/05/63 HR 03.8 LAT 46-12 N LONG 127-16 W SNDG 2743 WEA 01 WIND VEL 30 DIR 34
BAROM 24.0 TEMP DRY 10.6 WET 8.3 RELHU 73 WTRCLR SECDI SEA 3 DIR 34 SWELL 4 DIR 33
CLOUD TYPE AMT 5 VIS 7 WIRE ANGLE(S) 7

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	11.61	32.551	24.78	6.51	0.581	-0.045	108
1	5	11.60	32.545	24.78	6.53	0.583	-0.046	109
1	10	11.62	32.544	24.78	6.52	0.582	-0.046	109
1	20	11.58	32.549	24.79	6.56	0.586	-0.049	109
1	30	10.03	32.531	25.04	6.88	0.614	-0.059	111
1	50	9.71	32.534	25.10	6.52	0.582	-0.022	104
1	75	9.68	32.528	25.10	6.47	0.578	-0.018	103
1	100	8.34	33.015	25.69	5.11	0.456	0.120	79
1	125	7.93	33.573	26.19	3.52	0.314	0.265	54
1	150	7.76	33.759	26.36	3.20	0.286	0.295	49
1	175	7.58	33.869	26.47				
1	200	7.33	33.939	26.56	2.53	0.226	0.360	39

CNAV OSHAWA CRUISE OS2 STATION 014 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.11	0.13		32.549
8	0.10	0.13		32.544
22	0.16	0.09		32.537
49	0.23	0.06		32.525
100	0.02	0.00		33.112
	7.80	4.72	- WATER COLUMN VALUES	

MESSENGER TIME 1924 INCOMING SOLAR RADIATION - AM 138 PM 214

CNAV OSHAWA CRUISE OS2 STATION 014 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.61	0.00	32.551	0.000	24.78	317.4	0.000	0.00	6.51	0.00	
10	11.62	0.00	32.544	0.000	24.78	318.3	0.033	0.02	6.52	0.00	
20	11.58	0.00	32.549	0.000	24.79	317.4	0.065	0.07	6.56	0.00	
30	10.03	0.00	32.531	0.000	25.04	293.1	0.095	0.14	6.88	0.00	
50	9.71	0.00	32.534	0.000	25.10	288.2	0.154	0.38	6.52	0.00	
75	9.68	0.00	32.528	0.000	25.10	288.7	0.227	0.85	6.47	0.00	
100	8.34	0.00	33.015	0.000	25.69	232.9	0.292	1.43	5.11	0.00	
150	7.76	0.00	33.759	0.000	26.36	170.2	0.394	2.70	3.20	0.00	
200	7.33	0.00	33.939	0.000	26.56	151.6	0.475	4.14	2.53	0.00	

CNAV OSHAWA CRUISE OS2 STATION 015 OBSERVED VALUES

DATE 25/05/63 HR 07.1 LAT 46-12 N LONG 127-50 W SNDG 2743 WEA 02 WIND VEL 20 DIR 35
BAROM 25.0 TEMP DRY 10.0 WET 7.8 RELHU 74 WTRCLR SECCI SEA 4 DIR 35 SWELL 4 DIR 42
CLOUD TYPE AMT 5 VIS 7 WIRE ANGLE(S) 12, 3

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
2	0	11.62	32.551	24.78	6.45	0.576	-0.039	107
2	5	11.60	32.554	24.79	6.44	0.575	-0.038	107
2	10	11.61	32.547	24.78	6.45	0.576	-0.039	107
2	20	11.58	32.542	24.78	6.45	0.576	-0.039	107
2	30	11.26	32.546	24.84	6.59	0.589	-0.048	109
2	50	9.78	32.545	25.10	6.61	0.590	-0.031	106
2	75	9.68	32.543	25.11	6.43	0.574	-0.014	102
2	100	8.76	32.828	25.48	5.54	0.495	0.076	87
2	125	7.89	33.324	26.00	4.49	0.401	0.180	69
2	150	7.60	33.708	26.34	3.70	0.330	0.253	57
2	176	7.39	33.845	26.48	3.28	0.293	0.293	50
1	186	7.20	33.890	26.54	3.11	0.278	0.310	47
1	238	6.58	33.929	26.65	2.80	0.250	0.347	42
1	287	5.97	33.948	26.75	2.41	0.215	0.390	36
1	482	4.73	34.073	26.99	0.96	0.086	0.538	14
1	729	3.96	34.249	27.22	0.03	0.003	0.633	0
1	979	3.38	34.375	27.37	0.31	0.028	0.616	4
1	1476	2.52	34.530	27.57	0.69	0.062	0.596	9
1	1773	2.12	34.575	27.64	0.11	0.010	0.655	1

CNAV OSHAWA CRUISE OS2 STATION 015 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.13	0.16		32.555
8	0.12	0.14		32.552
22	0.12	0.08		32.552
49	0.11	0.13		32.541
100	0.11	0.03		32.553
	5.79	5.46	- WATER COLUMN VALUES	

MESSENGER TIME 2229 INCOMING SOLAR RADIATION - AM 138 PM 214

CNAV OSHAWA CRUISE OS2 STATION 015 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.62	0.00	32.551	0.000	24.78	317.5	0.000	0.00	6.45	0.00	
10	11.61	0.00	32.547	0.000	24.78	317.9	0.033	0.02	6.45	0.00	
20	11.58	0.00	32.542	0.000	24.78	317.9	0.065	0.07	6.45	0.00	
30	11.26	0.00	32.546	0.000	24.84	312.3	0.096	0.15	6.59	0.00	
50	9.78	0.00	32.545	0.000	25.10	288.5	0.157	0.39	6.61	0.00	
75	9.68	0.00	32.543	0.000	25.11	287.6	0.229	0.86	6.43	0.00	
100	8.76	0.00	32.828	0.000	25.48	252.9	0.297	1.47	5.54	0.00	
150	7.60	0.00	33.708	0.000	26.34	171.7	0.404	2.79	3.70	0.00	
200	7.08	0.03	33.910	0.005	26.57	150.4	0.486	4.23	3.02	0.01	0.98
250	6.43	0.00	33.934	0.001	26.68	140.6	0.559	5.92	2.71	0.00	0.73
300	5.85	0.01	33.955	0.001	26.77	132.4	0.628	7.86	2.30	0.00	1.10
400	5.10	0.05	34.015	0.003	26.91	120.1	0.755	12.41	1.52	0.02	1.21
500	4.66	0.01	34.086	0.001	27.01	110.6	0.872	17.77	0.85	0.00	0.92
600	4.29	0.03	34.159	0.003	27.11	102.0	0.979	23.82	0.38	0.01	0.68
700	4.02	0.01	34.229	0.001	27.19	94.5	1.078	30.44	0.08	0.00	0.85
800	3.78	0.00	34.289	0.001	27.27	88.2	1.171	37.55	0.05	0.04	0.70
1000	3.34	0.00	34.384	0.000	27.38	77.7	1.338	52.98	0.35	0.01	0.98
1200	2.96	0.01	34.458	0.001	27.48	69.2	1.487	69.74	0.60	0.06	0.89
1500	2.49	0.00	34.535	0.000	27.58	59.9	1.683	96.84	0.68	0.00	12.25

CNAV OSHAWA CRUISE OS2 STATION 016 OBSERVED VALUES

DATE 25/05/63 HR 12.6 LAT 46-12 N LONG 128-55 W SNDG 2743 WEA 01 WIND VEL 36 DIR 34
BAROM 26.0 TEMP DRY 10.6 WET 94.4 RELHU 99 WTRCLR SECDI SEA 3 DIR 34 SWELL 3 DIR 34
CLOUD TYPE AMT 4 VIS WIRE ANGLE(S) 18,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	11.95	32.655	24.80	6.48	0.579	-0.046	109
1	5	11.95	32.649	24.80	6.51	0.581	-0.049	109
1	10	11.94	32.647	24.80	6.47	0.578	-0.045	108
1	19	11.95	32.649	24.80	6.48	0.579	-0.046	109
1	28	11.91	32.653	24.81	6.51	0.581	-0.049	109
1	47	9.94	32.535	25.06	6.68	0.597	-0.040	107
1	71	9.91	32.550	25.08	6.44	0.575	-0.017	103
1	95	9.47	32.921	25.44	5.33	0.476	0.085	85
1	116	7.62	33.170	25.91				
1	147	7.70	33.653	26.28	3.83	0.342	0.240	59
1	167	7.37	33.831	26.47	3.68	0.329	0.257	56
1	192	7.11	33.897	26.56	3.20	0.286	0.303	49
1	240	6.45	33.934	26.67	2.84	0.254	0.345	42
1	287	5.81	33.951	26.77	2.31	0.206	0.402	34
2	495	4.70	34.116	27.03	0.75	0.067	0.557	11
2	744	4.00	34.295	27.25	0.44	0.039	0.595	6
2	994	3.47	34.412	27.39	0.78	0.070	0.573	11
2	1495	2.48	34.532	27.58	0.78	0.070	0.589	11
2	1794	2.07	34.578	27.65	1.30	0.116	0.549	17

CNAV OSHAWA CRUISE OS2 STATION 016 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.07	0.15	4.92	32.657
8	0.08	0.07		32.651
22	0.10	0.08		32.657
49	0.29	0.20		32.542
100	0.05	0.06		32.987
	7.10	5.43	- WATER COLUMN VALUES	

MESSENGER TIME 0521 INCOMING SOLAR RADIATION - AM 325 PM 329

CNAV OSHAWA CRUISE OS2 STATION 016 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.95	0.00	32.655	0.000	24.80	315.7	0.000	0.00	6.48	0.00	
10	11.94	0.00	32.647	0.000	24.80	316.3	0.032	0.02	6.47	0.00	
20	11.96	0.01	32.650	0.001	24.79	316.6	0.064	0.07	6.48	0.00	0.86
30	11.72	0.07	32.642	0.004	24.83	313.3	0.096	0.15	6.53	0.01	0.96
50	9.87	0.06	32.522	0.003	25.06	291.7	0.157	0.40	6.69	0.01	0.86
75	9.91	0.03	32.503	0.010	25.02	286.8	0.230	0.86	6.28	0.01	0.80
100	9.02	0.09	32.981	0.004	25.56	245.5	0.297	1.46	5.12	0.01	0.98
150	7.66	0.01	33.687	0.000	26.31	174.1	0.402	2.77	3.81	0.01	0.78
200	7.01	0.01	33.908	0.002	26.58	149.5	0.484	4.22	3.12	0.02	0.91
250	6.31	0.00	33.938	0.001	26.70	138.8	0.557	5.89	2.73	0.01	0.77
300	5.69	0.02	33.959	0.001	26.79	130.3	0.625	7.80	2.18	0.00	1.13
400	5.00	0.10	34.032	0.007	26.93	117.6	0.750	12.27	1.31	0.00	1.40
500	4.68	0.00	34.120	0.000	27.04	108.4	0.864	17.52	0.73	0.00	0.97
600	4.35	0.02	34.197	0.002	27.13	99.8	0.969	23.45	0.48	0.04	0.68
700	4.09	0.01	34.266	0.001	27.22	92.6	1.066	29.93	0.41	0.03	0.79
800	3.87	0.00	34.326	0.001	27.29	86.5	1.157	36.90	0.50	0.03	0.75
1000	3.46	0.00	34.414	0.000	27.40	76.8	1.322	52.10	0.78	0.03	0.99
1200	3.03	0.01	34.474	0.004	27.48	68.9	1.469	68.73	0.77	0.03	0.90
1500	2.47	0.00	34.533	0.000	27.58	59.8	1.665	95.77	0.78	0.00	12.93

CNAV OSHAWA CRUISE OS2 STATION 017 OBSERVED VALUES

DATE 25/05/63 HR 18.3 LAT 45-25 N LONG 130-00 W SNDG 2432 WEA 02 WIND VEL 8 DIR 01
BAROM 28.0 TEMP DRY 17.2 WET 12.8 RELHU 60 WTRCLR SECDI SEA 2 DIR 00 SWELL 1 DIR 33
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 7, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN				PHOS	NITR	SIL
					ML/L	MGA/L	AOU	SATN			
1	0	12.29	32.614	24.70	6.66	0.595	-0.066	112	0.51	0.2	1
1	5	12.24	32.612	24.71	6.68	0.597	-0.067	113	0.54	0.2	1
1	10	12.17	32.606	24.72	6.48	0.579	-0.049	109	0.53	0.2	0
1	20	12.12	32.620	24.74	6.43	0.574	-0.044	108	0.57	0.3	0
1	30	12.02	32.630	24.77	6.63	0.592	-0.060	111	0.60	0.4	1
1	50	9.88	32.554	25.09	6.41	0.573	-0.015	103	0.73	1.8	3
1	74	9.85	32.554	25.09	6.36	0.568	-0.010	102	0.74	2.2	4
1	99	8.70	32.870	25.52	5.60	0.500	0.072	87	1.12	11.1	11
1	124	7.15	33.196	26.00	5.31	0.474	0.117	80	1.44	17.8	22
1	149	7.01	33.454	26.22	4.85	0.433	0.159	73	1.47	18.7	26
1	174	7.11	33.768	26.46	4.26	0.380	0.209	65	1.55	18.3	28
1	200	6.96	33.891	26.57	3.85	0.344	0.247	58	1.69	23.2	35
1	250	6.19	33.919	26.70	3.16	0.282	0.320	47	2.45	16.0	52
1	300	5.53	33.944	26.80	2.50	0.223	0.389	36	2.60	26.0	45
2	496	4.55	34.099	27.03	0.85	0.076	0.551	12	2.73	34.4	69
2	743	4.09	34.312	27.25	0.32	0.029	0.604	5	2.81	31.6	77
2	993	3.42	34.418	27.40	0.39	0.035	0.608	5	3.41	33.3	136
2	1357	2.57	34.507	27.55	0.65	0.058	0.599	9	2.64	33.3	106
2	1621	2.14	34.554	27.63	0.97	0.087	0.578	13	2.99	42.4	159
2	1820	1.99	34.590	27.67	1.39	0.124	0.543	19	2.90	44.6	152

CNAV OSHAWA CRUISE OS2 STATION 017 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL
0	0.19	0.38	4.02				32.611
4	0.21	0.41	3.70			50	32.609
22	0.17	0.23	0.04			10	32.622
50	0.19	0.29	0.00	0.76	100	1	32.603
				1.73	59		
				0.40	47		
				0.23	33		
				0.11	18		
				0.11	6		
	9.26	14.53	49.10	- WATER COLUMN VALUES			

MESSENGER TIME 1145 INCOMING SOLAR RADIATION - AM 325 PM 329

LIGHT SATURATION INCUBATOR ILLUMINATION 20000

CNAV OSHAWA CRUISE OS2 STATION 017 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.29	0.00	32.614	0.000	24.70	324.8	0.000	0.00	6.66	0.00	
10	12.17	0.00	32.606	0.000	24.72	323.4	0.033	0.02	6.48	0.00	
20	12.12	0.00	32.620	0.000	24.74	321.7	0.066	0.07	6.43	0.00	
30	12.02	0.00	32.630	0.000	24.77	319.4	0.098	0.15	6.63	0.00	
50	9.88	0.00	32.554	0.000	25.09	289.4	0.159	0.40	6.41	0.00	
75	9.82	0.00	32.563	0.002	25.10	288.2	0.232	0.87	6.33	0.01	0.94
100	8.63	0.01	32.884	0.000	25.54	246.8	0.299	1.46	5.59	0.00	0.94
150	7.01	0.00	33.468	0.002	26.23	181.6	0.407	2.81	4.83	0.00	0.94
200	6.96	0.00	33.891	0.000	26.57	150.2	0.491	4.29	3.85	0.00	
250	6.19	0.00	33.919	0.000	26.70	138.7	0.564	5.97	3.16	0.00	
300	5.53	0.00	33.944	0.000	26.80	129.3	0.631	7.87	2.50	0.00	
400	4.84	0.08	34.017	0.003	26.94	116.8	0.756	12.31	1.50	0.02	1.27
500	4.54	0.00	34.103	0.000	27.04	108.0	0.869	17.53	0.83	0.00	0.98
600	4.32	0.04	34.194	0.005	27.13	99.6	0.974	23.44	0.49	0.05	0.69
700	4.15	0.03	34.278	0.003	27.22	92.3	1.071	29.91	0.33	0.03	0.79
800	3.94	0.01	34.343	0.002	27.29	86.1	1.161	36.85	0.31	0.02	0.74
1000	3.40	0.00	34.420	0.000	27.41	75.7	1.325	51.90	0.39	0.00	0.98
1200	2.91	0.01	34.475	0.002	27.50	67.4	1.470	68.23	0.51	0.00	0.75
1500	2.31	0.00	34.533	0.001	27.59	58.0	1.660	94.54	0.80	0.01	0.67

CNAV OSHAWA CRUISE OS2 STATION 018 OBSERVED VALUES

DATE 26/05/63 HR 00.7 LAT 44-36 N LONG 130-00 W SNDG 2852 WEA 02 WIND VEL 6 DIR 36
BAROM 27.0 TEMP DRY 11.1 WET 10.6 RELHU 94 WTRCLR SECDI SEA 1 DIR 36 SWELL 2 DIR 34
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) 6,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	12.80	32.613	24.61	6.43	0.574	-0.051	110
1	5	12.64	32.608	24.63	6.45	0.576	-0.051	110
1	10	12.47	32.607	24.67	6.45	0.576	-0.049	109
1	20	12.10	32.607	24.74	6.55	0.585	-0.054	110
1	30	10.79	32.674	25.02	7.25	0.648	-0.101	119
1	50	10.05	32.643	25.13	6.71	0.599	-0.044	108
1	75	9.75	32.624	25.16	6.44	0.575	-0.016	103
1	100	9.62	32.655	25.21	6.20	0.554	0.007	99
1	125	7.65	33.038	25.81	5.60	0.500	0.085	85
1	150	7.32	33.605	26.30	4.45	0.397	0.190	68
1	175	7.30	33.862	26.50	3.64	0.325	0.262	55
2	193	7.02	33.897	26.57	3.62	0.323	0.267	55
2	242	6.21	33.931	26.70	2.97	0.265	0.337	44
2	272	5.63	33.927	26.77	2.78	0.248	0.363	40
2	430	4.71	34.058	26.98	1.05	0.094	0.530	15
2	587	4.20	34.143	27.11	0.77	0.069	0.563	11
2	869	3.47	34.346	27.34	0.26	0.023	0.620	4
2	1019	3.15	34.416	27.43	0.29	0.025	0.624	4

CNAV OSHAWA CRUISE OS2 STATION 018 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.14	0.34		32.620
4	0.14	0.37		32.607
22	0.28	0.23		32.615
50	0.38	0.45		32.663
100	0.12	0.05		32.601
	13.57	16.22	- WATER COLUMN VALUES	

MESSENGER TIME 1622 INCOMING SOLAR RADIATION - AM 325 PM 329

CNAV OSHAWA CRUISE OS2 STATION 018 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.80	0.00	32.613	0.000	24.61	334.2	0.000	0.00	6.43	0.00	
10	12.47	0.00	32.607	0.000	24.67	328.8	0.034	0.02	6.45	0.00	
20	12.10	0.00	32.607	0.000	24.74	322.3	0.067	0.07	6.55	0.00	
30	10.79	0.00	32.674	0.000	25.02	294.9	0.098	0.15	7.25	0.00	
50	10.05	0.00	32.643	0.000	25.13	285.5	0.156	0.39	6.71	0.00	
75	9.75	0.00	32.624	0.000	25.16	282.7	0.228	0.85	6.44	0.00	
100	9.62	0.00	32.655	0.000	25.21	278.8	0.299	1.48	6.20	0.00	
150	7.32	0.00	33.605	0.000	26.30	175.5	0.413	2.88	4.45	0.00	
200	6.91	0.00	33.906	0.001	26.59	148.4	0.495	4.33	3.54	0.03	1.03
250	6.05	0.01	33.930	0.001	26.72	136.2	0.566	5.98	2.91	0.01	0.67
300	5.32	0.08	33.943	0.007	26.82	127.0	0.633	7.85	2.47	0.07	1.51
400	4.73	0.08	34.025	0.008	26.96	115.0	0.755	12.21	1.37	0.07	1.10
500	4.45	0.01	34.097	0.003	27.04	107.4	0.867	17.39	0.84	0.06	0.61
600	4.16	0.00	34.153	0.001	27.12	100.9	0.972	23.32	0.74	0.01	0.97
700	3.88	0.00	34.226	0.006	27.20	93.2	1.070	29.86	0.52	0.03	0.89
800	3.63	0.00	34.298	0.005	27.29	85.8	1.161	36.82	0.35	0.02	0.90
1000	3.19	0.00	34.410	0.001	27.42	74.0	1.323	51.68	0.27	0.00	11.85

CNAV OSHAWA CRUISE OS2 STATION 019 OBSERVED VALUES

DATE 26/05/63 HR 06.0 LAT 44-36 N LONG 128-54 W SNDG WEA 03 WIND VEL 10 DIR 01
BAROM 26.0 TEMP DRY 11.1 WET 8.9 RELHU 75 WTRCLR SECDI SEA 1 DIR 01 SWELL 2 DIR 35
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 15,15, 4

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
3	0	12.21	32.618	24.72	6.44	0.575	-0.046	109
3	5	12.21	32.620	24.72	6.35	0.567	-0.038	107
3	10	12.22	32.615	24.72	6.43	0.574	-0.045	108
3	20	12.05	32.614	24.75	6.44	0.575	-0.044	108
3	30	11.87	32.622	24.79	6.52	0.582	-0.049	109
3	50	10.22	32.622	25.08	6.47	0.578	-0.025	104
3	75	10.25	32.643	25.09	6.32	0.564	-0.012	102
3	100	9.09	32.716	25.34	5.94	0.531	0.037	94
3	125	7.93	33.167	25.87	5.19	0.464	0.117	80
3	150	8.12	33.654	26.22	3.94	0.352	0.224	61
3	175	7.98	33.823	26.37	2.16	0.193	0.385	33
1	190	7.71	33.892	26.47	2.34	0.209	0.372	36
1	237	6.99	33.954	26.62	2.54	0.227	0.364	38
1	285	6.46	33.985	26.71	2.26	0.202	0.396	34
2	434	5.27	34.116	26.97	0.94	0.084	0.531	14
2	958	3.59	34.384	27.36	0.40	0.036	0.605	6
2	1454	2.50	34.521	27.57	0.66	0.059	0.599	9
2	1753	2.09	34.571	27.64	1.16	0.104	0.562	16

CNAV OSHAWA CRUISE OS2 STATION 019 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.07	0.18		32.619
4	0.11	0.11		32.623
22	0.11			32.615
50	0.28	0.18		32.615
100	0.09			32.625
	7.78	7.05	- WATER COLUMN VALUES	

MESSENGER TIME 2255 INCOMING SOLAR RADIATION - AM 325 PM 329

CNAV OSHAWA CRUISE OS2 STATION 019 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.21	0.00	32.618	0.000	24.72	323.0	0.000	0.00	6.44	0.00	
10	12.22	0.00	32.615	0.000	24.72	323.7	0.033	0.02	6.43	0.00	
20	12.05	0.00	32.614	0.000	24.75	320.9	0.066	0.07	6.44	0.00	
30	11.87	0.00	32.622	0.000	24.79	317.3	0.098	0.15	6.52	0.00	
50	10.22	0.00	32.622	0.000	25.08	289.8	0.159	0.40	6.47	0.00	
75	10.25	0.00	32.643	0.000	25.09	289.2	0.232	0.87	6.32	0.00	
100	9.09	0.00	32.716	0.000	25.34	266.1	0.302	1.49	5.94	0.00	
150	8.12	0.00	33.654	0.000	26.22	183.1	0.415	2.89	3.94	0.00	
200	7.54	0.00	33.916	0.006	26.51	156.2	0.500	4.41	2.43	0.00	1.11
250	6.83	0.00	33.964	0.001	26.65	143.8	0.576	6.15	2.49	0.01	0.72
300	6.32	0.01	33.998	0.001	26.74	135.2	0.646	8.13	2.13	0.02	1.08
400	5.50	0.01	34.085	0.002	26.91	119.6	0.775	12.72	1.25	0.04	0.81
500	4.94	0.06	34.161	0.003	27.04	108.3	0.890	18.01	0.67	0.10	1.12
600	4.50	0.12	34.224	0.006	27.14	99.5	0.995	23.92	0.38	0.20	1.23
700	4.14	0.14	34.279	0.007	27.22	92.2	1.092	30.38	0.21	0.23	1.17
800	3.86	0.12	34.326	0.006	27.29	86.4	1.182	37.33	0.18	0.19	1.00
1000	3.48	0.00	34.399	0.000	27.38	78.1	1.349	52.66	0.39	0.00	0.88
1200	3.00	0.00	34.462	0.002	27.48	69.3	1.498	69.49	0.44	0.00	0.73
1500	2.42	0.00	34.530	0.000	27.58	59.5	1.694	96.53	0.72	0.00	4.07

CNAV OSHAWA CRUISE OS2 STATION 020 OBSERVED VALUES

DATE 26/05/63 HR 09.6 LAT 44-36 N LONG 128-22 W SNDG 2834 WEA WIND VEL 10 DIR 01
BAROM 24.0 TEMP DRY 11.1 WET 8.3 RELHU 68 WTRCLR SECDI SEA 1 DIR 01 SWELL 1 DIR 35
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	12.14	32.590	24.71	6.32	0.564	-0.034	106
1	5	12.13	32.587	24.71	6.36	0.568	-0.037	107
1	10	12.14	32.585	24.71	6.48	0.579	-0.048	109
1	20	12.13	32.586	24.71	6.44	0.575	-0.045	108
1	29	12.06	32.596	24.73	6.53	0.583	-0.052	110
1	48	10.49	32.635	25.05	6.53	0.583	-0.033	106
1	73	10.15	32.619	25.09	6.36	0.568	-0.014	103
1	97	9.01	32.774	25.37	5.89	0.526	0.042	93
1	121	7.56	33.101	25.87	5.42	0.484	0.102	83
1	146	8.22	33.629	26.19	3.86	0.345	0.230	60
1	170	7.97	33.836	26.39	3.23	0.288	0.289	50
1	195	7.62	33.914	26.50	2.98	0.266	0.316	46
1	244	6.85	33.986	26.66	2.42	0.216	0.376	36
1	293	6.13	33.967	26.74	2.35	0.210	0.393	35

CNAV OSHAWA CRUISE OS2 STATION 020 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.10	0.15		32.599
4	0.06	0.13		32.599
22	0.10	0.08		32.592
50	0.41	0.31		32.613
100	0.12	0.02		32.598
	8.86	8.06	- WATER COLUMN VALUES	

MESSENGER TIME 0203 INCOMING SOLAR RADIATION - AM 228 PM 291

CNAV OSHAWA CRUISE 0S2 STATION 020 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.14	0.00	32.590	0.000	24.71	323.8	0.000	0.00	6.32	0.00	
10	12.14	0.00	32.585	0.000	24.71	324.4	0.033	0.02	6.48	0.00	
20	12.13	0.00	32.586	0.000	24.71	324.4	0.066	0.07	6.44	0.00	
30	11.99	0.03	32.598	0.001	24.75	321.2	0.098	0.15	6.53	0.00	0.98
50	10.44	0.03	32.632	0.003	25.05	292.7	0.160	0.40	6.53	0.00	0.91
75	10.08	0.01	32.622	0.001	25.11	288.0	0.233	0.87	6.33	0.00	0.88
100	8.78	0.04	32.778	0.002	25.44	256.9	0.302	1.48	5.86	0.02	0.84
150	8.21	0.02	33.678	0.004	26.23	182.6	0.413	2.86	3.71	0.01	0.79
200	7.54	0.00	33.926	0.000	26.52	155.5	0.498	4.37	2.91	0.01	0.95
250	6.76	0.00	33.991	0.002	26.68	140.7	0.573	6.09	2.37	0.00	14.02

CNAV OSHAWA CRUISE OS2 STATION 021 OBSERVED VALUES

DATE 26/05/63 HR 12.0 LAT 44-36 N LONG 127-50 W SNDG 2834 WEA 03 WIND VEL 12 DIR 35
BAROM 24.0 TEMP DRY 10.6 WET 8.3 RELHU 73 WTRCLR SECDI SEA 1 DIR 01 SWELL 1 DIR 35
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 12,18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	12.12	32.574	24.71	6.43	0.574	-0.043	108
1	5	12.10	32.577	24.71	6.52	0.582	-0.051	110
1	10	12.11	32.570	24.70	6.50	0.581	-0.050	109
1	20	12.08	32.576	24.71	6.46	0.577	-0.046	109
1	29	10.53	32.609	25.02	6.94	0.620	-0.070	113
1	49	10.09	32.590	25.08	6.56	0.586	-0.031	106
1	73	10.21	32.636	25.09	6.35	0.567	-0.014	103
1	98	7.99	32.945	25.68	5.63	0.503	0.078	87
1	122	8.06	33.331	25.98	4.47	0.399	0.179	69
1	147	8.22	33.648	26.20	3.54	0.316	0.259	55
1	171	7.83	33.788	26.37	3.53	0.315	0.264	54
2	186	7.31	33.834	26.48	3.76	0.336	0.251	57
2	233	6.67	33.927	26.64	3.45	0.308	0.287	52
2	279	6.04	33.922	26.72	3.06	0.273	0.329	45
2	466	4.59	34.046	26.99	0.95	0.085	0.541	14
2	699	3.95	34.240	27.21	0.36	0.032	0.603	5
2	933	3.69	34.401	27.36	0.37	0.033	0.606	5
2	1412	2.66	34.517	27.55	0.64	0.057	0.598	9
2	1704	2.17	34.563	27.63	1.06	0.095	0.569	14

CNAV OSHAWA CRUISE OS2 STATION 021 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.17	0.27	2.36	32.584
4	0.14	0.13		32.580
22	0.20	0.25		32.584
50	0.65	0.28		32.599
100	0.04	0.01		32.901
	15.68	11.64	- WATER COLUMN VALUES	

MESSENGER TIME 0414 INCOMING SOLAR RADIATION - AM 228 PM 291

CNAV OSHAWA CRUISE OS2 STATION 021 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.12	0.00	32.574	0.000	24.71	324.7	0.000	0.00	6.43	0.00	
10	12.11	0.00	32.570	0.000	24.70	325.0	0.033	0.02	6.50	0.00	
20	12.08	0.00	32.576	0.000	24.71	324.2	0.066	0.07	6.46	0.00	
30	10.45	0.03	32.609	0.001	25.03	294.2	0.097	0.15	6.94	0.02	0.99
50	10.11	0.02	32.589	0.001	25.07	290.5	0.156	0.39	6.55	0.00	0.95
75	10.03	0.06	32.654	0.002	25.14	284.9	0.228	0.85	6.31	0.00	0.89
100	7.95	0.03	32.977	0.002	25.72	230.2	0.293	1.43	5.54	0.01	0.88
150	8.20	0.00	33.672	0.001	26.22	182.9	0.397	2.73	3.50	0.01	0.84
200	7.04	0.05	33.871	0.001	26.55	152.7	0.482	4.23	3.75	0.05	1.12
250	6.43	0.00	33.930	0.004	26.67	141.0	0.556	5.94	3.31	0.00	0.64
300	5.81	0.02	33.929	0.003	26.75	133.9	0.625	7.89	2.81	0.04	1.18
400	4.95	0.04	33.987	0.008	26.90	120.4	0.754	12.47	1.66	0.09	1.15
500	4.44	0.02	34.074	0.001	27.03	109.1	0.869	17.80	0.77	0.03	0.84
600	4.12	0.04	34.157	0.003	27.13	100.1	0.975	23.75	0.44	0.07	0.67
700	3.95	0.00	34.241	0.000	27.21	92.8	1.073	30.25	0.36	0.00	0.99
800	3.82	0.02	34.316	0.001	27.28	86.7	1.163	37.24	0.32	0.02	0.61
1000	3.56	0.02	34.427	0.005	27.40	77.0	1.329	52.47	0.38	0.00	0.94
1200	3.14	0.04	34.486	0.010	27.48	69.2	1.477	69.16	0.47	0.01	0.89
1500	2.48	0.01	34.528	0.002	27.58	60.3	1.674	96.36	0.74	0.00	9.91

CNAV OSHAWA CRUISE OS2 STATION 022 OBSERVED VALUES

DATE 26/05/63 HR 15.3 LAT 44-36 N LONG 127-16 W SNDG 2743 WEA 02 WIND VEL 10 DIR 36
BAROM 24.0 TEMP DRY 11.1 WET 8.3 RELHU 68 WTRCLR SECDI SEA 1 DIR 36 SWELL 2 DIR 36
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	AOU	SATN
1	0	12.06	32.558	24.70	6.38	0.570	-0.038	107
1	5	12.06	32.557	24.70	6.43	0.574	-0.043	108
1	10	12.07	32.559	24.70	6.38	0.570	-0.038	107
1	20	12.07	32.555	24.70	6.35	0.567	-0.036	107
1	29	11.72	32.559	24.77	6.52	0.582	-0.047	109
1	48	9.91	32.538	25.07	6.51	0.581	-0.024	104
1	72	10.00	32.592	25.10	6.27	0.560	-0.004	101
1	96	8.07	32.962	25.69	5.58	0.498	0.081	86
1	121	8.03	33.449	26.07	5.49	0.490	0.088	85
1	144	8.11	33.751	26.30	3.23	0.288	0.288	50
1	169	7.67	33.876	26.46	2.98	0.266	0.315	46
1	195	7.31	33.928	26.55	2.87	0.256	0.330	44

CNAV OSHAWA CRUISE OS2 STATION 022 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.03	0.25		32.562
4	0.13	0.20		32.563
22	0.11	0.16		32.566
50	0.12	0.15		32.563
	5.59	8.45	- WATER COLUMN VALUES	

MESSENGER TIME 0729 INCOMING SOLAR RADIATION - AM 228 PM 291

CNAV OSHAWA CRUISE OS2 STATION 022 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.06	0.00	32.558	0.000	24.70	324.8	0.000	0.00	6.38	0.00	
10	12.07	0.00	32.559	0.000	24.70	325.1	0.033	0.02	6.38	0.00	
20	12.07	0.00	32.555	0.000	24.70	325.6	0.066	0.07	6.35	0.00	
30	11.62	0.03	32.558	0.001	24.79	317.7	0.098	0.15	6.53	0.00	0.98
50	9.91	0.06	32.535	0.003	25.07	291.3	0.160	0.40	6.50	0.00	0.91
75	9.76	0.07	32.627	0.004	25.16	282.6	0.232	0.86	6.18	0.02	0.84
100	7.99	0.04	33.042	0.006	25.76	225.9	0.296	1.43	5.63	0.07	0.81
150	8.03	0.02	33.794	0.004	26.34	171.4	0.396	2.68	3.06	0.07	0.75

CNAV OSHAWA CRUISE OS2 STATION 023 OBSERVED VALUES

COMPARISON STATION WITH RV BROWN BEAR AND RV ACONA

DATE 26/05/63 HR 18.2 LAT 44-40 N LONG 126-59 W SNDG 2743 WEA 02 WIND VEL 10 DIR 33
BAROM 25.0 TEMP DRY 13.3 WET 10.6 RELHU 72 WTRCLR SECDI SEA 1 DIR 33 SWELL 2 DIR 32
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 20, 8

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	12.14	32.553	24.69	6.36	0.568	-0.037	107
2	5	12.09	32.554	24.70	6.29	0.562	-0.031	106
2	10	12.07	32.550	24.70	6.33	0.565	-0.034	106
2	20	12.01	32.551	24.71	6.32	0.564	-0.032	106
2	30	11.61	32.527	24.76	6.41	0.573	-0.036	107
2	50	10.19	32.536	25.02	6.36	0.568	-0.014	103
2	74	9.46	32.883	25.41	5.36	0.479	0.083	85
2	99	8.39	33.513	26.07	3.95	0.353	0.220	62
2	124	8.09	33.764	26.31	3.29	0.294	0.282	51
2	149	7.92	33.893	26.44	2.88	0.257	0.321	45
2	174	7.71	33.905	26.48	2.79	0.249	0.332	43
1	182	7.77	33.917	26.48	2.64	0.236	0.344	41
1	229	7.02	33.972	26.63	2.49	0.222	0.368	38
1	276	6.42	33.986	26.72	2.07	0.185	0.414	31
1	462	5.08	34.121	26.99	0.81	0.072	0.546	12
1	694	4.26	34.294	27.22	0.27	0.024	0.606	4
1	925	3.68	34.404	27.37	0.47	0.042	0.597	7
1	1390	2.68	34.519	27.55	0.63	0.056	0.599	9
1	1601	2.19	34.565	27.63	1.04	0.093	0.571	14

CNAV OSHAWA CRUISE OS2 STATION 023 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL
0	0.06	0.11	0.56				32.554
9	0.04	0.10	1.98			50	32.553
35	0.03	0.14	0.20	0.07	100	10	32.554
				0.06	59		
				0.32	47		
				0.05	33		
				0.04	18		
				0.00	6		
60	0.02	0.12	0.00			1	32.555
	2.09	7.30	42.28	- WATER COLUMN VALUES			

MESSENGER TIME 1128 INCOMING SOLAR RADIATION - AM 228 PM 291

LIGHT SATURATION INCUBATOR ILLUMINATION 19800

CNAV OSHAWA CRUISE OS2 STATION 023 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.14	0.00	32.553	0.000	24.69	326.6	0.000	0.00	6.36	0.00	
10	12.07	0.00	32.550	0.000	24.70	325.8	0.033	0.02	6.33	0.00	
20	12.01	0.00	32.551	0.000	24.71	324.8	0.066	0.07	6.32	0.00	
30	11.61	0.00	32.527	0.000	24.76	319.8	0.099	0.15	6.41	0.00	
50	10.19	0.00	32.536	0.000	25.02	295.7	0.161	0.40	6.36	0.00	
75	9.41	0.01	32.909	0.004	25.44	256.3	0.230	0.84	5.30	0.01	0.94
100	8.37	0.00	33.528	0.002	26.08	195.2	0.287	1.34	3.91	0.00	0.94
150	7.92	0.00	33.895	0.001	26.44	162.3	0.377	2.48	2.87	0.00	0.96
200	7.44	0.01	33.936	0.004	26.54	153.4	0.457	3.90	2.64	0.02	0.87
250	6.74	0.00	33.980	0.002	26.67	141.3	0.531	5.61	2.32	0.01	0.60
300	6.18	0.02	34.000	0.002	26.76	133.3	0.600	7.57	1.87	0.00	1.19
400	5.40	0.04	34.069	0.005	26.91	119.7	0.728	12.12	1.15	0.00	1.09
500	4.91	0.02	34.151	0.002	27.04	108.7	0.843	17.42	0.66	0.01	0.83
600	4.52	0.03	34.227	0.003	27.14	99.5	0.948	23.35	0.38	0.02	0.68
700	4.24	0.00	34.297	0.000	27.22	92.0	1.045	29.80	0.27	0.00	0.97
800	3.98	0.01	34.351	0.001	27.29	85.9	1.135	36.72	0.32	0.03	0.60
1000	3.51	0.01	34.428	0.003	27.40	76.4	1.299	51.83	0.47	0.03	0.95
1200	3.08	0.01	34.482	0.005	27.49	68.9	1.446	68.42	0.52	0.05	0.99
1500	2.43	0.00	34.541	0.001	27.59	58.8	1.640	95.19	0.80	0.01	5.49

CNAV OSHAWA CRUISE OS2 STATION 024 OBSERVED VALUES

DATE 26/05/63 HR 22.5 LAT 44-36 N LONG 126-10 W SNDG 2907 WEA 03 WIND VEL 10 DIR 33
BAROM 25.0 TEMP DRY 17.2 WET 12.8 RELHU 60 WTRCLR SECDI SEA 1 DIR 33 SWELL 1 DIR 32
CLOUD TYPE AMT 6 VIS 7 WIRE ANGLE(S) 10,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.45	32.656	24.71	6.28	0.561	-0.034	106
1	5	12.30	32.653	24.73	6.32	0.564	-0.036	107
2	10	12.22	32.643	24.74	6.38	0.570	-0.040	108
2	20	12.13	32.641	24.76	6.32	0.564	-0.034	106
2	30	12.13	32.648	24.76	6.37	0.569	-0.038	107
2	49	10.33	32.550	25.01	6.35	0.567	-0.015	103
2	74	9.65	32.817	25.33	5.52	0.493	0.067	88
2	99	8.20	33.437	26.04	4.17	0.372	0.204	65
2	123	8.21	33.778	26.30	3.19	0.285	0.290	50
2	148	7.83	33.919	26.47	2.98	0.266	0.313	46
2	173	7.46	33.928	26.53	2.72	0.243	0.341	42
2	197	7.17	33.955	26.59	2.61	0.233	0.355	40
2	246	6.27	33.938	26.70	2.88	0.257	0.344	43
2	295	5.93	33.970	26.77	2.24	0.200	0.406	33

CNAV OSHAWA CRUISE OS2 STATION 024 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.11	0.45		32.653
9	0.10	0.48		32.646
35	0.10	0.33		32.655
60	0.27	0.44		32.580
	8.18	24.40	- WATER COLUMN VALUES	

MESSENGER TIME 1440 INCOMING SOLAR RADIATION - AM 228 PM 291

CNAV OSHAWA CRUISE OS2 STATION 024 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.45	0.00	32.656	0.000	24.71	324.6	0.000	0.00	6.28	0.00	
10	12.22	0.00	32.643	0.000	24.74	321.6	0.033	0.02	6.38	0.00	
20	12.13	0.00	32.641	0.000	24.76	320.4	0.065	0.07	6.32	0.00	
30	12.13	0.00	32.648	0.000	24.76	320.1	0.098	0.15	6.37	0.00	
50	10.29	0.02	32.553	0.001	25.02	296.1	0.160	0.40	6.33	0.00	0.95
75	9.59	0.01	32.841	0.004	25.36	264.0	0.230	0.85	5.47	0.01	0.94
100	8.19	0.01	33.456	0.000	26.06	198.0	0.288	1.36	4.12	0.00	0.94
150	7.80	0.00	33.922	0.002	26.48	158.6	0.378	2.49	2.96	0.00	0.89
200	7.11	0.01	33.955	0.001	26.60	147.5	0.455	3.87	2.63	0.02	0.97
250	6.21	0.01	33.960	0.014	26.73	135.9	0.527	5.51	2.63	0.16	14.57

CNAV OSHAWA CRUISE OS2 STATION 025 OBSERVED VALUES

DATE 27/05/63 HR 00.9 LAT 44-36 N LONG 125-35 W SNDG 2889 WEA 02 WIND VEL 10 DIR 33
BAROM 23.0 TEMP DRY 13.3 WET 10.0 RELHU 66 WTRCLR SECDI SEA 2 DIR 33 SWELL 2 DIR 34
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 0,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.23	31.994	24.04	6.18	0.552	-0.031	106
1	5	13.11	32.001	24.07	6.10	0.545	-0.023	104
1	10	12.91	32.090	24.18	6.23	0.556	-0.033	106
1	20	12.70	32.582	24.60	6.34	0.566	-0.042	108
1	30	12.08	32.682	24.80	6.35	0.567	-0.036	107
1	50	10.68	32.616	25.00	6.50	0.581	-0.033	106
1	75	10.32	32.855	25.25	5.50	0.491	0.060	89
1	100	9.09	33.439	25.90	3.98	0.355	0.209	63
1	125	8.69	33.705	26.17	3.16	0.282	0.286	50
1	150	8.12	33.827	26.36	2.52	0.225	0.350	39
1	176	7.56	33.949	26.53	2.17	0.194	0.389	33
2	189	7.38	33.976	26.58	2.14	0.191	0.394	33
2	237	6.89	34.034	26.69	1.89	0.169	0.423	29
2	285	6.38	34.055	26.78	1.55	0.138	0.461	23
2	478	5.40	34.160	26.98	0.74	0.066	0.547	11
2	725	4.39	34.305	27.21	0.34	0.030	0.598	5
2	975	3.65	34.406	27.37	0.39	0.035	0.605	5
2	1475	2.57	34.538	27.58	0.75	0.067	0.590	10
2	1773	2.09	34.579	27.65	1.21	0.108	0.557	16

CNAV OSHAWA CRUISE OS2 STATION 025 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.12	0.25		31.998
9	0.11	0.26		32.161
35	0.30	0.23		32.620
60	0.23	0.15		32.660
100	0.04	0.07		33.537
	13.21	13.42	- WATER COLUMN VALUES	

MESSENGER TIME 1755 INCOMING SOLAR RADIATION - AM 228 PM 291

CNAV OSHAWA CRUISE OS2 STATION 025 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.23	0.00	31.994	0.000	24.04	387.7	0.000	0.00	6.18	0.00	
10	12.91	0.00	32.090	0.000	24.18	374.9	0.039	0.02	6.23	0.00	
20	12.70	0.00	32.582	0.000	24.60	335.1	0.075	0.07	6.34	0.00	
30	12.08	0.00	32.682	0.000	24.80	316.7	0.107	0.16	6.35	0.00	
50	10.68	0.00	32.616	0.000	25.00	297.8	0.169	0.41	6.50	0.00	
75	10.32	0.00	32.855	0.000	25.25	274.7	0.241	0.87	5.50	0.00	
100	9.09	0.00	33.439	0.000	25.90	212.6	0.303	1.41	3.98	0.00	
150	8.12	0.00	33.827	0.000	26.36	170.3	0.399	2.62	2.52	0.00	
200	7.26	0.01	33.994	0.001	26.61	146.5	0.479	4.04	2.10	0.00	1.24
250	6.75	0.00	34.041	0.001	26.72	136.9	0.551	5.69	1.80	0.00	0.72
300	6.27	0.02	34.062	0.000	26.80	129.8	0.618	7.58	1.46	0.01	1.12
400	5.68	0.06	34.115	0.001	26.92	119.7	0.744	12.08	0.99	0.02	1.20
500	5.30	0.00	34.174	0.001	27.01	111.8	0.861	17.47	0.68	0.00	0.90
600	4.87	0.00	34.234	0.002	27.11	103.1	0.969	23.58	0.47	0.01	0.68
700	4.48	0.00	34.291	0.001	27.19	95.3	1.069	30.27	0.35	0.00	0.86
800	4.15	0.01	34.339	0.001	27.27	88.7	1.162	37.42	0.33	0.01	0.69
1000	3.59	0.00	34.415	0.000	27.38	78.2	1.331	52.96	0.40	0.00	0.97
1200	3.11	0.01	34.476	0.001	27.48	69.6	1.481	69.83	0.50	0.01	0.89
1500	2.53	0.00	34.542	0.000	27.58	59.8	1.678	96.98	0.78	0.00	12.33

CNAV OSHAWA CRUISE OS2 STATION 026 OBSERVED VALUES

DATE 27/05/63 HR 04.2 LAT 44-36 N LONG 125-02 W SNDG WEA 02 WIND VEL 8 DIR 34
BAROM 23.0 TEMP DRY 12.8 WET 10.0 RELHU 70 WTRCLR SECDI SEA 2 DIR 33 SWELL 2 DIR 35
CLOUD TYPE AMT 6 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.05	30.343	22.81	6.19	0.553	-0.024	105
1	5	13.04	30.370	22.83	6.23	0.556	-0.028	105
1	10	12.50	30.788	23.25	6.31	0.564	-0.031	106
1	20	11.47	31.982	24.37	6.54	0.584	-0.044	108
1	30	10.68	32.312	24.76	6.62	0.591	-0.043	108
1	50	10.26	32.455	24.95	6.22	0.556	-0.002	100
1	75	9.60	32.987	25.47	5.08	0.454	0.106	81
1	100	8.84	33.607	26.07	3.61	0.322	0.244	57
1	125	8.45	33.812	26.29	2.91	0.260	0.311	46
1	150	8.10	33.910	26.42	2.61	0.233	0.342	41
1	170	7.79	33.962	26.51	2.34	0.209	0.370	36
1	200	7.50	33.994	26.58	2.18	0.195	0.389	33
1	250	6.97	34.033	26.68	1.94	0.173	0.417	29
1	299	6.50	34.045	26.76	1.70	0.152	0.445	25

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CNAV OSHAWA CRUISE OS2 STATION 026 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.13	0.08		30.333
9	0.19	0.06		30.797
35	0.53	0.18		32.195
60	0.60	0.16		32.474
	24.81	7.96	- WATER COLUMN VALUES	

MESSENGER TIME 2028 INCOMING SOLAR RADIATION - AM 228 PM 291

CNAV OSHAWA CRUISE OS2 STATION 026 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.05	0.00	30.343	0.000	22.81	505.9	0.000	0.00	6.19	0.00	
10	12.50	0.00	30.788	0.000	23.25	463.3	0.049	0.02	6.31	0.00	
20	11.47	0.00	31.982	0.000	24.37	357.4	0.091	0.09	6.54	0.00	
30	10.68	0.00	32.312	0.000	24.76	319.9	0.125	0.17	6.62	0.00	
50	10.26	0.00	32.455	0.000	24.95	302.8	0.187	0.43	6.22	0.00	
75	9.60	0.00	32.987	0.000	25.47	253.4	0.258	0.87	5.08	0.00	
100	8.84	0.00	33.607	0.000	26.07	196.3	0.314	1.37	3.61	0.00	
150	8.10	0.00	33.910	0.000	26.42	163.8	0.405	2.51	2.61	0.00	
200	7.50	0.00	33.994	0.000	26.58	149.9	0.484	3.93	2.18	0.00	
250	6.97	0.00	34.033	0.000	26.68	140.5	0.557	5.61	1.94	0.00	

CNAV OSHAWA CRUISE OS2 STATION 027 OBSERVED VALUES

DATE 27/05/63 HR 06.9 LAT 44-36 N LONG 124-26 W SNDG 73 WEA 02 WIND VEL 8 DIR 36
BAROM 23.0 TEMP DRY 12.2 WET 10.0 RELHU 76 WTRCLR SECDI SEA 1 DIR 36 SWELL 2 DIR 35
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN				PHOS	NITR	SIL
					ML/L	MGA/L	ADU	SATN			
1	0	11.08	31.861	24.34	6.45	0.576	-0.030	106	0.54	0.1	4
1	5	11.03	31.883	24.37	6.50	0.581	-0.034	106	0.58	0.2	5
1	10	11.05	31.868	24.35	6.47	0.578	-0.032	106	0.58	0.2	3
1	20	10.60	32.212	24.70	6.57	0.587	-0.037	107	0.61	0.2	4
1	30	10.21	32.353	24.87	6.50	0.581	-0.026	105	0.62	0.3	3
1	50	9.92	32.427	24.98	6.36	0.568	-0.010	102	0.87	2.3	5

CNAV OSHAWA CRUISE OS2 STATION 027 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY		SAL
		LAB-I	DECK-I	
0	0.21	0.55		31.880
2	0.74	0.34		31.885
7	0.45	0.48		31.893
14	0.13	0.48		32.184
60	0.26	0.03		32.868
	5.94	6.30	- WATER COLUMN VALUES	

MESSENGER TIME 2301 INCOMING SOLAR RADIATION - AM 228 PM 291

CNAV OSHAWA CRUISE OS2 STATION 027 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.08	0.00	31.861	0.000	24.34	359.3	0.000	0.00	6.45	0.00	
10	11.05	0.00	31.868	0.000	24.35	358.4	0.037	0.02	6.47	0.00	
20	10.60	0.00	32.212	0.000	24.70	325.8	0.071	0.07	6.57	0.00	
30	10.21	0.00	32.353	0.000	24.87	309.2	0.103	0.15	6.50	0.00	
50	9.92	0.00	32.427	0.000	24.98	299.5	0.164	0.40	6.36	0.00	

CNAV OSHAWA CRUISE OS2 STATION 028 OBSERVED VALUES

YAQUINA BAY ENTRANCE

DATE 27/05/63 HR 08.2 LAT 44-36 N LONG 124-12 W SNDG 58 WEA 02 WIND VEL 10 DIR 36
BAROM 23.0 TEMP DRY 11.7 WET 10.0 RELHU 81 WTRCLR SECDI SEA 1 DIR 36 SWELL 1 DIR 35
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	11.58	32.542	24.78	6.73	0.601	-0.064	112
1	5	11.49	32.604	24.85	6.44	0.575	-0.037	107
1	10	10.06	32.752	25.21	5.84	0.522	0.033	94
1	20	8.84	33.276	25.82	3.71	0.331	0.237	58
1	30	8.30	33.646	26.19	2.50	0.223	0.351	39
1	50	7.81	33.883	26.45	1.80	0.161	0.419	28

CNAV OSHAWA CRUISE OS2 STATION 028 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.58	0.00	32.542	0.000	24.78	317.5	0.000	0.00	6.73	0.00	
10	10.06	0.00	32.752	0.000	25.21	276.9	0.030	0.01	5.84	0.00	
20	8.84	0.00	33.276	0.000	25.82	219.4	0.055	0.05	3.71	0.00	
30	8.30	0.00	33.646	0.000	26.19	184.3	0.076	0.10	2.50	0.00	
50	7.81	0.00	33.883	0.000	26.45	160.0	0.110	0.24	1.80	0.00	

CNAV OSHAWA CRUISE OS2 STATION 029 OBSERVED VALUES

DATE 27/05/63 HR 11.7 LAT 44-07 N LONG 124-55 W SNDG 201 WEA 02 WIND VEL 14 DIR 00
BAROM 22.0 TEMP DRY 11.1 WET 10.0 RELHU 87 WTRCLR SECDI SEA 1 DIR 36 SWELL 1 DIR 35
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) 20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	11.67	31.667	24.09	6.43	0.574	-0.035	106
1	5	11.67	31.667	24.09	6.51	0.581	-0.042	108
1	9	11.50	31.860	24.27	6.59	0.589	-0.048	109
1	19	10.57	32.332	24.80	6.60	0.589	-0.038	107
1	28	10.28	32.400	24.90	6.31	0.564	-0.010	102
1	47	9.75	32.524	25.08	5.96	0.532	0.027	95
1	71	9.44	32.893	25.42	5.14	0.459	0.103	82
1	94	8.89	33.422	25.92	3.54	0.316	0.251	56
1	118	7.96	33.780	26.34	2.40	0.214	0.364	37
1	141	6.92	34.019	26.68	1.68	0.150	0.441	25
1	165	6.72	34.043	26.72	1.75	0.156	0.438	26

CNAV OSHAWA CRUISE OS2 STATION 029 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.36	0.77	5.20	31.670
5	0.31	0.37		31.676
17	0.99	1.58		32.230
34	1.06	0.87		32.420
100	0.07	0.00		33.472
	26.84	35.38	- WATER COLUMN VALUES	

MESSENGER TIME 0358 INCOMING SOLAR RADIATION - AM 353 PM 298

CNAV OSHAWA CRUISE OS2 STATION 029 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.67	0.00	31.667	0.000	24.09	383.7	0.000	0.00	6.43	0.00	
10	11.41	0.02	31.917	0.006	24.33	360.9	0.038	0.02	6.60	0.00	1.00
20	10.52	0.01	32.348	0.005	24.82	314.5	0.072	0.07	6.57	0.01	0.85
30	10.22	0.00	32.410	0.003	24.92	305.0	0.103	0.15	6.27	0.01	0.96
50	9.71	0.01	32.559	0.001	25.12	286.4	0.163	0.39	5.89	0.01	0.86
75	9.37	0.00	32.985	0.008	25.51	249.9	0.230	0.82	4.87	0.03	0.78
100	8.68	0.01	33.526	0.003	26.04	200.0	0.287	1.32	3.21	0.00	0.73
150	6.68	0.02	34.039	0.011	26.73	134.8	0.371	2.36	1.58	0.01	4.68

CNAV OSHAWA CRUISE OS2 STATION 030 OBSERVED VALUES

DATE 27/05/63 HR 16.0 LAT 43-32 N LONG 125-50 W SNDG 805 WEA 03 WIND VEL 16 DIR 36
BAROM 22.0 TEMP DRY 18.3 WET 13.3 RELHU 56 WTRCLR SECDI SEA 2 DIR 36 SWELL 2 DIR 35
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 13,23

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.95	32.433	24.44	6.07	0.542	-0.020	104
1	5	12.92	32.431	24.44	6.07	0.542	-0.020	104
1	10	12.94	32.426	24.43	6.07	0.542	-0.020	104
1	20	12.89	32.485	24.49	6.12	0.547	-0.024	105
1	29	12.66	32.583	24.61	6.23	0.556	-0.032	106
1	49	11.29	32.655	24.92	6.32	0.564	-0.024	105
1	73	10.12	32.914	25.33	5.52	0.493	0.060	89
1	98	8.93	33.369	25.87	4.31	0.385	0.182	68
1	122	8.35	33.663	26.19	3.65	0.326	0.247	57
1	147	7.95	33.821	26.38	3.27	0.292	0.286	51
1	171	7.57	33.907	26.50	2.88	0.257	0.325	44
2	178	7.60	33.906	26.49	2.88	0.257	0.325	44
2	223	7.07	33.982	26.63	2.39	0.213	0.376	36
2	460	5.52	34.142	26.96	0.85	0.076	0.535	12
2	706	4.46	34.318	27.22	0.29	0.026	0.601	4

CNAV OSHAWA CRUISE OS2 STATION 030 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.10	0.22		32.417
8	0.08	0.56		32.422
26	0.15	0.56		32.562
52	0.27	0.28		32.644
	7.25	24.14	- WATER COLUMN VALUES	

MESSENGER TIME 0813 INCOMING SOLAR RADIATION - AM 353 PM 298

CNAV OSHAWA CRUISE OS2 STATION 030 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.95	0.00	32.433	0.000	24.44	350.2	0.000	0.00	6.07	0.00	
10	12.94	0.00	32.426	0.000	24.43	350.8	0.036	0.02	6.07	0.00	
20	12.89	0.00	32.485	0.000	24.49	345.7	0.071	0.07	6.12	0.00	
30	12.60	0.01	32.587	0.003	24.62	333.1	0.105	0.16	6.25	0.00	0.99
50	11.24	0.00	32.662	0.000	24.94	303.8	0.169	0.42	6.30	0.00	0.95
75	10.01	0.01	32.950	0.004	25.37	262.7	0.241	0.87	5.42	0.01	0.89
100	8.87	0.00	33.399	0.000	25.91	212.2	0.300	1.40	4.24	0.00	0.88
150	7.91	0.00	33.833	0.002	26.39	166.8	0.396	2.60	3.23	0.00	0.87
200	7.28	0.03	33.956	0.008	26.58	149.7	0.476	4.02	2.59	0.03	0.77
250	6.83	0.03	34.010	0.007	26.68	140.3	0.549	5.70	2.15	0.01	1.34
300	6.42	0.06	34.056	0.015	26.77	132.3	0.617	7.64	1.74	0.03	1.79
400	5.79	0.05	34.120	0.013	26.91	120.7	0.745	12.20	1.11	0.02	1.25
500	5.37	0.02	34.154	0.005	26.98	114.1	0.864	17.67	0.72	0.01	82.40
600	5.00	0.05	34.202	0.013	27.07	107.1	0.975	23.96	0.47	0.02	68.70
700	4.50	0.01	34.309	0.002	27.21	94.2	1.077	30.73	0.30	0.00	99.99

CNAV OSHAWA CRUISE OS2 STATION 031 OBSERVED VALUES

DATE 27/05/63 HR 19.4 LAT 43-12 N LONG 126-22 W SNDG 759 WEA 02 WIND VEL 14 DIR 02
BAROM 23.0 TEMP DRY 17.8 WET 13.3 RELHU 60 WTRCLR SECDI SEA 1 DIR 02 SWELL 1 DIR 35
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) --

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	13.07	32.399	24.39	6.04	0.539	-0.019	104
1	5	12.99	32.399	24.40	6.13	0.547	-0.026	105
1	10	12.98	32.393	24.40	6.08	0.543	-0.021	104
1	20	12.90	32.409	24.43	6.15	0.549	-0.027	105
1	30	12.86	32.521	24.52	6.23	0.556	-0.034	106
1	50	11.30	32.660	24.92	6.45	0.576	-0.036	107
1	75	9.53	33.067	25.54	5.01	0.447	0.113	80
1	100	8.59	33.526	26.05	3.92	0.350	0.220	61
1	125	8.12	33.769	26.31	3.30	0.295	0.281	51
1	150	7.75	33.897	26.47	3.04	0.272	0.309	47
1	175	7.38	33.943	26.56	2.88	0.257	0.328	44
1	201	7.16	33.959	26.60	2.69	0.240	0.348	41
1	251	6.61	33.995	26.70	2.28	0.204	0.392	34
1	300	6.11	34.026	26.79	1.75	0.156	0.447	26

CNAV OSHAWA CRUISE OS2 STATION 031 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL
0	0.07	0.47	4.32	0.32	100		32.399
				0.18			
				0.22			
				0.15	33		
				0.05	18		
				0.00	6		
10	0.08	0.15	1.16			50	32.400
33	0.11	0.28	1.06			10	32.552
70	0.47	0.03	0.30			1	32.892
100	0.08	0.08					33.528
150	0.02						33.848
	13.49	13.73	78.12	- WATER COLUMN VALUES			

MESSENGER TIME 1130 INCOMING SOLAR RADIATION - AM 353 PM 298

LIGHT SATURATION INCUBATOR ILLUMINATION 19900

CNAV OSHAWA CRUISE OS2 STATION 031 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.07	0.00	32.399	0.000	24.39	354.9	0.000	0.00	6.04	0.00	
10	12.98	0.00	32.393	0.000	24.40	353.9	0.036	0.02	6.08	0.00	
20	12.90	0.00	32.409	0.000	24.43	351.5	0.072	0.07	6.15	0.00	
30	12.86	0.00	32.521	0.000	24.52	342.8	0.107	0.16	6.23	0.00	
50	11.30	0.00	32.660	0.000	24.92	305.0	0.172	0.43	6.45	0.00	
75	9.53	0.00	33.067	0.000	25.54	246.4	0.241	0.86	5.01	0.00	
100	8.59	0.00	33.526	0.000	26.05	198.6	0.297	1.36	3.92	0.00	
150	7.75	0.00	33.897	0.000	26.47	159.8	0.388	2.49	3.04	0.00	
200	7.17	0.00	33.959	0.000	26.60	147.9	0.465	3.88	2.70	0.00	0.93
250	6.62	0.00	33.994	0.000	26.70	138.7	0.538	5.55	2.29	0.00	0.97
300	6.11	0.00	34.026	0.000	26.79	130.4	0.605	7.46	1.75	0.00	

CNAV OSHAWA CRUISE OS2 STATION 032 OBSERVED VALUES

DATE 27/05/63 HR 21.7 LAT 42-49 N LONG 126-43 W SNDG 2907 WEA 01 WIND VEL 12 DIR 01
BAROM 22.0 TEMP DRY 14.4 WET 12.2 RELHU 77 WTRCLR SECDI SEA 1 DIR 02 SWELL 1 DIR 36
CLOUD TYPE AMT VIS 7 WIRE ANGLE(S) 17,22

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.73	32.66.	24.66	6.24	0.557	-0.034	106
1	5	12.64	32.658	24.67	6.32	0.564	-0.040	108
1	10	12.40	32.647	24.71	6.44	0.575	-0.048	109
1	19	12.30	32.652	24.73	6.35	0.567	-0.039	107
1	29	12.27	32.658	24.74	6.36	0.568	-0.039	107
1	48	10.93	32.683	25.01	6.36	0.568	-0.024	104
1	72	9.71	32.984	25.45	5.31	0.474	0.084	85
1	96	8.84	33.393	25.91	4.18	0.373	0.194	66
1	120	8.11	33.795	26.33	3.27	0.292	0.284	51
1	144	7.81	33.907	26.47	2.89	0.258	0.321	45
1	168	7.55	33.938	26.53	2.71	0.242	0.341	42
2	184	7.37	33.960	26.57	2.61	0.233	0.352	40
2	229	7.01	33.987	26.64	2.34	0.209	0 381	35
2	276	6.39	33.996	26.73	2.08	0.186	0.413	31
2	462	5.21	34.130	26.98	0.84	0.075	0.541	12
2	695	4.43	34.291	27.20	0.34	0.030	0.597	5
2	931	3.78	34.416	27.37	0.68	0.061	0.577	10
2	1431	2.68	34.541	27.57	0.77	0.069	0.586	10
2	1718	2.06	34.581	27.65	1.16	0.104	0.562	16

CNAV OSHAWA CRUISE OS2 STATION 032 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.08	0.32		32.646
10	0.13	0.17		32.636
33	0.18	0.42		33.401
70	0.53	0.30		32.640
	17.96	22.51	- WATER COLUMN VALUES	

MESSENGER TIME 1426 INCOMING SOLAR RADIATION - AM 353 PM 298

CNAV OSHAWA CRUISE OS2 STATION 032 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.73	0.00	32.667	0.000	24.66	328.9	0.000	0.00	6.24	0.00	
10	12.40	0.00	32.647	0.000	24.71	324.6	0.033	0.02	6.44	0.00	
20	12.31	0.01	32.652	0.000	24.73	322.7	0.066	0.07	6.35	0.00	0.88
30	12.22	0.02	32.657	0.001	24.75	321.0	0.098	0.15	6.37	0.01	0.97
50	10.81	0.00	32.700	0.002	25.04	293.8	0.160	0.40	6.30	0.01	0.91
75	9.59	0.00	33.032	0.002	25.51	249.9	0.229	0.83	5.16	0.01	0.84
100	8.70	0.01	33.470	0.007	25.99	204.3	0.286	1.34	4.00	0.01	0.80
150	7.74	0.00	33.918	0.003	26.48	158.1	0.377	2.48	2.83	0.01	0.75
200	7.24	0.02	33.974	0.001	26.60	147.9	0.454	3.86	2.51	0.00	1.03
250	6.74	0.02	33.992	0.001	26.68	140.5	0.527	5.54	2.22	0.00	0.61
300	6.17	0.03	34.009	0.003	26.77	132.4	0.596	7.48	1.91	0.02	1.19
400	5.46	0.06	34.077	0.006	26.91	119.8	0.723	12.02	1.23	0.04	1.09
500	5.05	0.01	34.158	0.001	27.02	109.9	0.839	17.36	0.69	0.01	0.83
600	4.69	0.03	34.228	0.001	27.12	101.5	0.946	23.38	0.42	0.01	0.67
700	4.42	0.00	34.294	0.000	27.20	94.3	1.045	29.97	0.34	0.00	0.97
800	4.13	0.00	34.352	0.000	27.28	87.5	1.137	37.05	0.45	0.04	0.61
1000	3.62	0.01	34.441	0.002	27.40	76.6	1.303	52.32	0.70	0.03	0.96
1200	3.16	0.01	34.499	0.005	27.49	68.5	1.450	68.89	0.74	0.07	0.92
1500	2.54	0.00	34.551	0.001	27.59	59.3	1.644	95.71	0.81	0.01	11.12

CNAV OSHAWA CRUISE OS2 STATION 033 OBSERVED VALUES

DATE 28/05/63 HR 03.2 LAT 42-28 N LONG 127-35 W SNDG 2925 WEA 03 WIND VEL 14 DIR 34
BAROM 20.0 TEMP DRY 14.4 WET 13.3 RELHU 89 WTRCLR SECDI SEA 1 DIR 34 SWELL 2 DIR 35
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 24,13

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
2	0	13.21	32.690	24.58	6.17	0.551	-0.033	106
2	5	13.18	32.693	24.59	6.24	0.557	-0.039	107
2	10	12.68	32.687	24.69	6.28	0.561	-0.037	107
2	20	12.42	32.690	24.74	6.36	0.568	-0.041	108
2	29	12.28	32.693	24.77	6.34	0.566	-0.038	107
2	49	10.93	32.770	25.07	6.14	0.548	-0.004	101
2	73	9.72	33.165	25.59	4.79	0.428	0.130	77
2	98	9.37	33.363	25.80	4.29	0.383	0.178	68
2	122	9.09	33.519	25.97	3.82	0.341	0.223	60
2	147	8.25	33.838	26.35	2.69	0.240	0.334	42
2	171	7.41	33.979	26.58	2.05	0.183	0.402	31
1	181	7.40	33.993	26.59	1.97	0.176	0.409	30
1	227	6.60	34.038	26.74	1.76	0.157	0.439	26
1	274	6.16	34.056	26.81	1.48	0.132	0.470	22
1	469	4.98	34.197	27.06	0.62	0.055	0.564	9
1	715	4.15	34.319	27.25	0.50	0.045	0.587	7
1	962	3.54	34.437	27.41	0.39	0.035	0.606	5
1	1458	2.07	34.542	27.62	0.82	0.073	0.592	11
1	1755	2.12	34.584	27.65	1.30	0.116	0.548	17

CNAV OSHAWA CRUISE OS2 STATION 033 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.08	0.09		32.683
10	0.08	0.16		32.701
33	0.20	0.14		32.682
	11.42	7.29	- WATER COLUMN VALUES	

MESSENGER TIME 1912 INCOMING SOLAR RADIATION - AM 353 PM 298

CNAV OSHAWA CRUISE OS2 STATION 033 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.21	0.00	32.690	0.000	24.58	336.2	0.000	0.00	6.17	0.00	
10	12.68	0.00	32.687	0.000	24.69	326.7	0.034	0.02	6.28	0.00	
20	12.42	0.00	32.690	0.000	24.74	322.0	0.067	0.07	6.36	0.00	
30	12.23	0.01	32.693	0.001	24.78	318.5	0.099	0.15	6.34	0.00	0.99
50	10.87	0.00	32.785	0.004	25.10	288.4	0.160	0.40	6.09	0.01	0.95
75	9.67	0.01	33.186	0.002	25.61	239.9	0.226	0.82	4.73	0.01	0.89
100	9.36	0.01	33.374	0.002	25.81	221.5	0.285	1.34	4.26	0.01	0.88
150	8.16	0.01	33.860	0.003	26.38	168.3	0.383	2.56	2.60	0.01	0.88
200	6.91	0.08	34.036	0.014	26.69	138.7	0.460	3.94	1.79	0.07	0.88
250	6.36	0.01	34.048	0.001	26.78	131.3	0.528	5.50	1.63	0.00	0.59
300	5.96	0.01	34.073	0.003	26.85	125.0	0.593	7.33	1.33	0.00	1.22
400	5.31	0.02	34.143	0.006	26.98	113.0	0.713	11.62	0.86	0.01	1.17
500	4.85	0.01	34.214	0.001	27.09	103.3	0.822	16.64	0.57	0.02	0.86
600	4.48	0.02	34.266	0.002	27.17	96.1	0.923	22.32	0.49	0.04	0.67
700	4.19	0.00	34.313	0.001	27.24	90.2	1.017	28.60	0.49	0.01	0.91
800	3.93	0.01	34.362	0.001	27.31	84.5	1.105	35.40	0.45	0.01	0.66
1000	3.40	0.03	34.449	0.002	27.43	73.5	1.265	50.10	0.40	0.00	0.96
1200	2.73	0.09	34.501	0.006	27.53	63.5	1.404	65.72	0.51	0.02	0.89
1500	2.26	0.15	34.547	0.000	27.61	56.4	1.586	90.91	0.88	0.00	11.79

CNAV OSHAWA CRUISE OS2 STATION 034 OBSERVED VALUES

DATE 28/05/63 HR 08.4 LAT 41-49 N LONG 128-36 W SNDG 3109 WEA 01 WIND VEL 0 DIR 00
BAROM 20.0 TEMP DRY 13.3 WET 12.2 RELHU 88 WTRCLR SECDI SEA 0 DIR 00 SWELL 1 DIR 36
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 4, 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.29	32.714	24.59	6.26	0.559	-0.042	108
1	5	13.27	32.719	24.60	6.28	0.561	-0.043	108
1	10	12.82	32.704	24.67	6.36	0.568	-0.046	109
1	20	12.42	32.706	24.75	6.36	0.568	-0.041	108
1	30	11.50	32.694	24.91	6.55	0.585	-0.047	109
1	50	10.77	32.664	25.02	6.52	0.582	-0.036	107
1	75	10.12	32.716	25.17	6.01	0.537	0.017	97
1	100	9.08	33.146	25.68	4.98	0.445	0.121	79
1	125	8.66	33.538	26.05	3.53	0.315	0.254	55
1	150	8.37	33.750	26.26	3.36	0.300	0.272	52
1	176	8.13	33.856	26.38	2.86	0.255	0.320	44
2	200	7.97	33.908	26.44	2.65	0.237	0.341	41
2	250	7.20	34.000	26.63	2.14	0.191	0.396	33
2	299	6.51	34.011	26.73	1.93	0.172	0.425	29
2	499	5.11	34.058	27.02	0.68	0.061	0.557	10
2	748	4.15	34.306	27.24	0.31	0.028	0.604	4
2	999	3.55	34.418	27.39	0.38	0.034	0.607	5
2	1498	2.56	34.548	27.59	0.86	0.077	0.580	12
2	1797	2.11	34.591	27.66	1.32	0.118	0.547	18

CNAV OSHAWA CRUISE OS2 STATION 034 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.07	0.22		32.711
10	0.16	0.48		32.708
33	0.06	0.71		32.659
70	0.26	0.20		32.717
100	0.03	0.06		33.140
	9.69	34.60	- WATER COLUMN VALUES	

MESSENGER TIME 0050 INCOMING SOLAR RADIATION - AM 269 PM 214

CNAV OSHAWA CRUISE OS2 STATION 034 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.29	0.00	32.714	0.000	24.59	335.9	0.000	0.00	6.26	0.00	
10	12.82	0.00	32.704	0.000	24.67	328.1	0.034	0.02	6.36	0.00	
20	12.42	0.00	32.706	0.000	24.75	320.8	0.067	0.07	6.36	0.00	
30	11.50	0.00	32.694	0.000	24.91	305.5	0.098	0.15	6.55	0.00	
50	10.77	0.00	32.664	0.000	25.02	295.8	0.159	0.40	6.52	0.00	
75	10.12	0.00	32.716	0.000	25.17	281.7	0.231	0.86	6.01	0.00	
100	9.08	0.00	33.146	0.000	25.68	234.1	0.296	1.44	4.98	0.00	
150	8.37	0.00	33.750	0.000	26.26	179.6	0.401	2.74	3.36	0.00	
200	7.97	0.00	33.908	0.000	26.44	162.9	0.487	4.28	2.65	0.00	
250	7.20	0.00	34.000	0.000	26.63	146.1	0.565	6.07	2.14	0.00	
300	6.50	0.00	34.012	0.000	26.73	136.5	0.636	8.08	1.92	0.00	1.01
400	5.63	0.07	34.077	0.008	26.89	121.8	0.767	12.73	1.29	0.06	1.33
500	5.10	0.00	34.159	0.000	27.02	110.5	0.884	18.13	0.68	0.00	0.99
600	4.65	0.02	34.223	0.000	27.12	101.3	0.991	24.15	0.42	0.04	0.69
700	4.29	0.01	34.280	0.000	27.21	93.8	1.089	30.72	0.31	0.02	0.78
800	4.01	0.01	34.332	0.000	27.28	87.6	1.181	37.78	0.30	0.01	0.76
1000	3.55	0.00	34.418	0.000	27.39	77.5	1.348	53.15	0.38	0.00	1.00
1200	3.12	0.00	34.482	0.002	27.48	69.3	1.497	69.91	0.52	0.00	0.89
1500	2.56	0.00	34.548	0.000	27.59	59.7	1.693	96.97	0.86	0.00	12.84

CNAV OSHAWA CRUISE OS2 STATION 34A BIOLOGICAL DATA

DATE 28/05/63 LAT 41-21 N LONG 129-17 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.10	0.48	5.16	32.719

MESSENGER TIME 0415 INCOMING SOLAR RADIATION - AM 269 PM 214

CNAV OSHAWA CRUISE OS2 STATION 035 OBSERVED VALUES

DATE 28/05/63 HR 13.4 LAT 41-13 N LONG 129-30 W SNDG 3109 WEA 01 WIND VEL 0 DIR 00
BAROM 18.0 TEMP DRY 13.9 WET 13.3 RELHU 94 WTRCLR SECDI SEA 0 DIR 00 SWELL 0 DIR 00
CLOUD TYPE AMT 6 VIS 7 WIRE ANGLE(S) 0, 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.87	32.714	24.47	6.10	0.545	-0.034	107
1	5	13.54	32.711	24.54	6.23	0.556	-0.042	108
1	10	12.77	32.691	24.67	6.47	0.578	-0.055	110
1	20	12.57	32.694	24.71	6.44	0.575	-0.050	109
1	30	12.52	32.697	24.73	6.40	0.572	-0.046	109
1	50	10.71	32.614	24.99	6.52	0.582	-0.035	106
1	75	10.36	32.647	25.08	6.36	0.568	-0.017	103
1	100	9.09	33.148	25.68	4.94	0.441	0.124	78
1	125	8.50	33.494	26.04	4.07	0.364	0.208	64
1	150	7.98	33.688	26.27	3.79	0.338	0.240	59
1	176	7.70	33.852	26.44	3.39	0.303	0.278	52
2	197	7.46	33.926	26.53	3.01	0.269	0.315	46
2	246	6.87	33.994	26.67	2.27	0.203	0.389	34
2	295	6.36	34.021	26.76	1.81	0.162	0.438	27
2	494	5.19	34.135	26.99	0.82	0.073	0.543	12
2	741	4.19	34.311	27.24	0.31	0.028	0.604	4
2	989	3.51	34.432	27.41	0.35	0.031	0.610	5
2	1487	2.53	34.544	27.58	0.86	0.077	0.581	12
2	1786	2.16	34.590	27.65	1.44	0.129	0.535	19

CNAV OSHAWA CRUISE OS2 STATION 035 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.09	0.33		32.707
10	0.08	0.35		32.689
33	0.17	0.55		32.684
70	0.20	0.26		32.632
100	0.06	0.03		32.983
	10.54	28.77	- WATER COLUMN VALUES	

MESSENGER TIME 0559 INCOMING SOLAR RADIATION - AM 269 PM 214

CNAV OSHAWA CRUISE OS2 STATION 035 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.87	0.00	32.714	0.000	24.47	347.1	0.000	0.00	6.10	0.00	
10	12.77	0.00	32.691	0.000	24.67	328.1	0.035	0.02	6.47	0.00	
20	12.57	0.00	32.694	0.000	24.71	324.4	0.067	0.07	6.44	0.00	
30	12.52	0.00	32.697	0.000	24.73	323.5	0.100	0.15	6.40	0.00	
50	10.71	0.00	32.614	0.000	24.99	298.4	0.163	0.41	6.52	0.00	
75	10.36	0.00	32.647	0.000	25.08	290.7	0.237	0.88	6.36	0.00	
100	9.09	0.00	33.148	0.000	25.68	234.1	0.303	1.47	4.94	0.00	
150	7.98	0.00	33.688	0.000	26.27	178.6	0.407	2.77	3.79	0.00	
200	7.42	0.00	33.933	0.001	26.54	153.4	0.491	4.25	2.96	0.00	0.99
250	6.83	0.00	33.997	0.001	26.67	141.2	0.565	5.96	2.23	0.00	0.91
300	6.32	0.00	34.024	0.000	26.76	133.3	0.634	7.91	1.77	0.00	1.04
400	5.63	0.05	34.079	0.001	26.89	121.7	0.763	12.51	1.17	0.04	1.30
500	5.16	0.00	34.139	0.000	27.00	112.6	0.881	17.96	0.80	0.00	0.97
600	4.71	0.01	34.212	0.004	27.11	102.9	0.990	24.09	0.52	0.01	0.68
700	4.33	0.00	34.282	0.002	27.20	94.1	1.089	30.72	0.35	0.01	0.80
800	4.01	0.01	34.344	0.000	27.29	86.7	1.181	37.76	0.29	0.01	0.74
1000	3.48	0.00	34.436	0.000	27.41	75.5	1.345	52.84	0.36	0.00	0.99
1200	3.04	0.00	34.493	0.005	27.50	67.5	1.490	69.17	0.50	0.00	0.90
1500	2.51	0.00	34.546	0.000	27.59	59.3	1.683	95.82	0.88	0.00	12.78

CNAV OSHAWA CRUISE OS2 STATION 036 OBSERVED VALUES

DATE 28/05/63 HR 19.0 LAT 40-37 N LONG 130-25 W SNDG 3611 WEA 01 WIND VEL 12 DIR 21
BAROM 18.0 TEMP DRY 17.2 WET 15.6 RELHU 85 WTRCLR SECDI SEA 2 DIR 21 SWELL 1 DIR 23
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 12,27

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	14.84	32.953	24.45	5.91	0.528	-0.027	105
1	5	14.76	32.941	24.46	5.85	0.522	-0.021	104
1	10	14.56	32.935	24.50	6.09	0.544	-0.041	108
1	20	14.15	32.928	24.58	6.01	0.537	-0.029	106
1	29	13.54	32.906	24.69	6.12	0.547	-0.033	106
1	49	12.20	32.945	24.98	6.31	0.564	-0.035	107
1	74	11.82	32.972	25.07	6.46	0.577	-0.044	108
1	98	11.44	33.009	25.17	5.94	0.531	0.007	99
1	123	9.98	33.157	25.54	5.39	0.481	0.073	87
1	147	8.42	33.407	25.98	5.13	0.458	0.115	80
1	172	8.04	33.586	26.18	4.85	0.433	0.144	75
2	173	8.05	33.621	26.21	4.83	0.431	0.146	75
2	217	8.07	33.910	26.43	4.24	0.379	0.197	66
2	261	7.39	33.965	26.57	3.58	0.320	0.265	55
2	438	5.17	34.007	26.89	1.83	0.163	0.454	26
2	660	4.20	34.238	27.18	0.44	0.039	0.592	6
2	883	3.69	34.377	27.34	0.29	0.026	0.613	4
2	1349	2.77	34.526	27.55	0.74	0.066	0.588	10
2	1643	2.32	34.569	27.62	1.05	0.094	0.567	14

CNAV OSHAWA CRUISE OS2 STATION 036 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.00	0.06	0.00	32.927
15	0.00	0.03	0.00	32.927
41	0.04	0.07	0.00	32.948
70	0.06	0.05	0.00	32.914
100	0.19	0.25		32.992
150	0.03			33.251
200	0.00			33.682
	1.91	3.81	0.00	- WATER COLUMN VALUES

MESSENGER TIME 1131 INCOMING SOLAR RADIATION - AM 269 PM 214

CNAV OSHAWA CRUISE OS2 STATION 036 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.84	0.00	32.953	0.000	24.45	349.0	0.000	0.00	5.91	0.00	
10	14.56	0.00	32.935	0.000	24.50	344.9	0.035	0.02	6.09	0.00	
20	14.15	0.00	32.928	0.000	24.58	337.4	0.070	0.07	6.01	0.00	
30	13.46	0.01	32.907	0.001	24.70	325.8	0.103	0.16	6.13	0.00	0.99
50	12.17	0.01	32.946	0.000	24.98	299.3	0.166	0.41	6.32	0.00	0.95
75	11.81	0.01	32.972	0.001	25.07	291.5	0.241	0.89	6.44	0.00	0.94
100	11.35	0.01	33.017	0.000	25.19	280.6	0.313	1.53	5.89	0.00	0.89
150	8.34	0.02	33.433	0.000	26.02	202.6	0.434	3.05	5.10	0.00	0.86
200	8.05	0.06	33.807	0.013	26.35	171.6	0.529	4.72	4.48	0.00	0.74
250	7.59	0.02	33.963	0.007	26.54	154.3	0.611	6.61	3.74	0.00	0.64
300	6.81	0.01	33.981	0.012	26.66	142.9	0.686	8.72	3.11	0.03	1.31
400	5.56	0.01	34.005	0.012	26.84	126.3	0.822	13.56	2.12	0.02	0.96
500	4.77	0.05	34.066	0.010	26.98	113.4	0.943	19.13	1.33	0.01	0.75
600	4.34	0.05	34.170	0.010	27.11	101.6	1.051	25.24	0.71	0.01	0.72
700	4.09	0.01	34.268	0.001	27.22	92.4	1.149	31.77	0.36	0.02	0.79
800	3.85	0.02	34.333	0.002	27.29	85.7	1.239	38.70	0.26	0.04	0.60
1000	3.44	0.00	34.428	0.003	27.41	75.5	1.402	53.71	0.35	0.03	0.93
1200	3.04	0.00	34.494	0.003	27.50	67.5	1.547	70.03	0.54	0.04	0.87
1500	2.52	0.00	34.550	0.001	27.59	59.2	1.740	96.64	0.93	0.01	7.44

CNAV OSHAWA CRUISE OS2 STATION 037 OBSERVED VALUES

DATE 29/05/63 HR 02.3 LAT 40-01 N LONG 13[illegible]-21 W SNDG 4187 WEA 02 WIND VEL 16 DIR 23
BAROM 17.0 TEMP DRY 15.6 WET 15.0 RELHU 94 WTRCLR SECDI SEA 2 DIR 23 SWELL 2 DIR 25
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 10,22

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	14.95	33.089	24.53	5.88	0.525	-0.026	105
1	5	14.94	33.097	24.54	5.91	0.528	-0.029	106
1	10	14.72	33.156	24.63	5.88	0.525	-0.024	105
1	20	14.05	33.159	24.78	5.84	0.522	-0.014	103
1	30	13.42	33.109	24.87	5.92	0.529	-0.014	103
1	49	13.12	33.117	24.93	5.90	0.527	-0.009	102
1	74	12.37	33.064	25.04	6.04	0.539	-0.013	103
2	92	11.78	33.083	25.16	5.87	0.524	0.009	98
1	98	11.06	33.115	25.32	5.63	0.503	0.038	93
1	123	9.63	33.304	25.71	5.30	0.473	0.085	85
1	147	8.42	33.479	26.04	5.29	0.472	0.100	82
1	171	8.29	33.776	26.29	4.98	0.445	0.129	78
1	197	8.16	33.904	26.41	4.57	0.408	0.167	71
1	247	7.88	33.970	26.50	4.32	0.386	0.192	67
1	296	7.07	33.970	26.62	3.73	0.333	0.256	57
2	326	6.29	33.954	26.71	3.15	0.281	0.319	47
2	559	4.49	34.115	27.05	0.91	0.081	0.546	13
2	1031	3.42	34.433	27.42	0.43	0.038	0.605	6
2	1981	1.97	34.617	27.69	1.56	0.139	0.528	21
2	2464	1.73	34.648	27.73	2.11	0.188	0.483	28
2	2949	1.59	34.668	27.76	2.49	0.222	0.451	33
2	3444	1.54	34.679	27.77	2.86	0.255	0.419	38

CNAV OSHAWA CRUISE OS2 STATION 037 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.00	0.11		33.073
15	0.00	0.00		33.153
41	0.00	0.16		33.087
70	0.04	0.00		33.121
100	0.02	0.05		33.076
	0.64	3.48	- WATER COLUMN VALUES	

MESSENGER TIME 1838 INCOMING SOLAR RADIATION - AM 269 PM 214

CNAV OSHAWA CRUISE OS2 STATION 037 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.95	0.00	33.089	0.000	24.53	341.3	0.000	0.00	5.88	0.00	
10	14.72	0.00	33.156	0.000	24.63	331.9	0.034	0.02	5.88	0.00	
20	14.05	0.00	33.159	0.000	24.78	318.5	0.067	0.07	5.84	0.00	
30	13.42	0.00	33.109	0.000	24.87	310.2	0.099	0.15	5.92	0.00	
50	13.09	0.00	33.115	0.001	24.94	304.0	0.161	0.40	5.91	0.00	0.95
75	12.33	0.01	33.064	0.000	25.05	294.1	0.236	0.88	6.03	0.01	0.93
100	11.15	0.14	33.124	0.004	25.31	269.3	0.307	1.52	5.67	0.05	0.99
150	8.37	0.02	33.517	0.005	26.08	196.9	0.424	2.98	5.26	0.00	0.84
200	8.15	0.00	33.912	0.001	26.42	165.3	0.516	4.60	4.55	0.01	0.97
250	7.85	0.00	33.971	0.000	26.51	157.3	0.597	6.47	4.30	0.00	0.91
300	6.97	0.01	33.968	0.000	26.63	146.0	0.674	8.63	3.66	0.00	0.82
400	5.26	0.24	33.978	0.018	26.86	124.8	0.810	13.49	2.15	0.10	2.85
500	4.55	0.21	34.050	0.016	27.00	112.0	0.930	18.98	1.22	0.08	1.84
600	4.32	0.04	34.146	0.002	27.10	103.3	1.038	25.11	0.75	0.06	0.97
700	3.98	0.11	34.218	0.005	27.19	94.8	1.138	31.78	0.45	0.17	0.87
800	3.71	0.13	34.287	0.006	27.27	87.5	1.231	38.87	0.28	0.20	0.76
1000	3.43	0.03	34.415	0.001	27.40	76.5	1.397	54.13	0.37	0.05	0.88
1200	3.08	0.01	34.494	0.011	27.50	68.0	1.543	70.61	0.53	0.07	0.94
1500	2.56	0.01	34.572	0.018	27.60	58.0	1.735	97.04	0.82	0.12	0.94
2000	1.96	0.00	34.619	0.000	27.69	49.7	2.008	145.92	1.58	0.00	0.93
2500	1.72	0.00	34.650	0.000	27.73	46.3	2.253	202.53	2.14	0.00	0.90
3000	1.58	0.00	34.670	0.000	27.76	44.7	2.485	268.47	2.53	0.00	5.38

CNAV OSHAWA CRUISE OS2 STATION 038 OBSERVED VALUES

DATE 29/05/63 HR 10.3 LAT 39-44 N LONG 131-12 W SNDG 4462 WEA 02 WIND VEL 4 DIR 30
BAROM 20.0 TEMP DRY 12.2 WET 11.1 RELHU 88 WTRCLR SECDI SEA 1 DIR 23 SWELL 1 DIR 26
CLOUD TYPE AMT 5 VIS 7 WIRE ANGLE(S) 0, 9

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	15.00	32.899	24.37	5.91	0.528	-0.029	106
1	5	14.92	32.891	24.39	5.88	0.525	-0.025	105
1	10	14.01	32.904	24.59	5.91	0.528	-0.019	104
1	20	13.93	32.908	24.61	5.95	0.531	-0.022	104
1	30	13.86	32.902	24.62	5.96	0.532	-0.022	104
1	50	13.03	32.878	24.77	5.99	0.535	-0.015	103
1	75	12.59	32.879	24.85	6.09	0.544	-0.019	104
1	100	11.89	32.900	25.00	6.03	0.539	-0.006	101
1	125	10.55	33.018	25.33	5.57	0.497	0.050	91
1	150	9.02	33.197	25.73	5.25	0.469	0.097	83
1	176	8.16	33.498	26.09	4.86	0.434	0.142	75
2	197	8.31	33.675	26.21	4.12	0.368	0.206	64
2	246	7.88	33.925	26.47	4.03	0.360	0.218	62
2	295	7.17	33.954	26.59	3.52	0.314	0.274	53
2	493	5.08	34.050	26.94	1.36	0.121	0.497	20
2	739	4.08	34.260	27.21	0.36	0.032	0.601	5

CNAV OSHAWA CRUISE OS2 STATION 038 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.00			32.891
15	0.00			32.899
41	0.00			32.880
70	0.03			32.877

0.50 - WATER COLUMN VALUES

MESSENGER TIME 0304 INCOMING SOLAR RADIATION - AM 223 PM 252

CNAV OSHAWA CRUISE OS2 STATION 038 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	15.00	0.00	32.899	0.000	24.37	356.2	0.000	0.00	5.91	0.00	
10	14.01	0.00	32.904	0.000	24.59	336.2	0.035	0.02	5.91	0.00	
20	13.93	0.00	32.908	0.000	24.61	334.6	0.069	0.07	5.95	0.00	
30	13.86	0.00	32.902	0.000	24.62	333.9	0.103	0.16	5.96	0.00	
50	13.03	0.00	32.878	0.000	24.77	320.2	0.169	0.43	5.99	0.00	
75	12.59	0.00	32.879	0.000	24.85	312.5	0.248	0.94	6.09	0.00	
100	11.89	0.00	32.900	0.000	25.00	298.8	0.325	1.63	6.03	0.00	
150	9.02	0.00	33.197	0.000	25.73	230.3	0.459	3.29	5.25	0.00	
200	8.30	0.01	33.697	0.000	26.23	183.4	0.563	5.14	4.09	0.03	0.99
250	7.83	0.00	33.932	0.003	26.48	159.9	0.650	7.12	4.00	0.01	0.91
300	7.10	0.00	33.956	0.000	26.60	148.7	0.727	9.32	3.46	0.01	1.04
400	5.91	0.00	34.003	0.004	26.80	130.9	0.868	14.34	2.31	0.06	1.29
500	5.03	0.00	34.054	0.000	26.94	117.4	0.994	20.11	1.29	0.00	44.87
600	4.44	0.00	34.117	0.004	27.06	106.7	1.107	26.48	0.54	0.05	63.33
700	4.13	0.00	34.212	0.003	27.17	97.1	1.210	33.34	0.46	0.05	73.06

CNAV OSHAWA CRUISE OS2 STATION 38A BIOLOGICAL DATA

DATE 29/05/63 LAT 39-43 N LONG 130-05 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.00	0.02	0.95	32 894

MESSENGER TIME 0415 INCOMING SOLAR RADIATION - AM 223 PM 252

CNAV OSHAWA CRUISE OS2 STATION 039 OBSERVED VALUES

DATE 29/05 63 HR 17.8 LAT 39-24 N LONG 128-57 W SNDG 2075 WEA 02 WIND VEL 4 DIR 31
BAROM 22.0 TEMP DRY 17.2 WET 16.7 RELHU 95 WTRCLR SECDI SEA 1 DIR 31 SWELL 1 DIR 26
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE:ST 3,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	14.68	32.765	24.34	5.90	0.527	-0.024	105
1	5	14.51	32.753	24.37	5.95	0.531	-0.027	105
1	10	13.70	32.746	24.53	6.13	0.547	-0.035	107
1	20	13.16	32.744	24.64	6.05	0.540	-0.022	104
1	30	13.08	32.745	24.65	6.12	0.547	-0.027	105
1	50	12.43	32.815	24.83	6.18	0.552	-0.026	105
1	75	11.82	32.771	24.91	6.27	0.560	-0.026	105
1	100	11.35	32.818	25.04	6.07	0.542	-0.003	101
1	125	9.64	32.982	25.46	5.31	0.474	0.085	85
1	150	8.53	33.346	25.92	4.65	0.415	0.157	73
1	176	8.11	33.627	26.20	4.10	0.366	0.210	64
2	195	7.89	33.796	26.37	3.70	0.330	0.248	57
2	244	7.56	33.946	26.53	3.71	0.331	0.251	57
2	293	6.58	33.939	26.66	3.12	0.279	0.318	47
2	489	5.23	34.104	26.96	0.92	0.082	0.534	13
2	732	4.19	34.295	27.23	0.28	0.025	0.606	4
2	976	3.55	34.407	27.38	0.28	0.025	0.616	4
2	1473	2.63	34.538	27.57	0.88	0.079	0.577	12
2	1771	2.17	34.584	27.65	1.36	0.121	0.542	18

CNAV OSHAWA CRUISE OS2 STATION 039 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	IRRAD	SAL
0	0.01	0.01	0.40				32.738
11	0.02	0.05	0.24			50	32.747
36	0.01	0.03	0.02	1.39	100	10	32.739
				0.20	75		
				0.28	55		
				0.16	37		
				0.11	19		
				0.14	6		
70	0.00	0.05	0.00			1	32.773
100	0.13	0.02					32.757
150	0.02						33.438
	0.65	2.89	7.12	- WATER COLUMN VALUES			

MESSENGER TIME 1128 INCOMING SOLAR RADIATION - AM 223 PM 252

LIGHT SATURATION INCUBATOR ILLUMINATION 18800

CNAV OSHAWA CRUISE OS2 STATION 039 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.68	0.00	32.765	0.000	24.34	359.5	0.000	0.00	5.90	0.00	
10	13.70	0.00	32.746	0.000	24.53	341.7	0.036	0.02	6.13	0.00	
20	13.16	0.00	32.744	0.000	24.64	331.8	0.070	0.07	6.05	0.00	
30	13.08	0.00	32.745	0.000	24.65	330.4	0.103	0.16	6.12	0.00	
50	12.43	0.00	32.815	0.000	24.83	313.7	0.168	0.42	6.18	0.00	
75	11.82	0.00	32.771	0.000	24.91	306.5	0.246	0.92	6.27	0.00	
100	11.35	0.00	32.818	0.000	25.04	295.3	0.322	1.60	6.07	0.00	
150	8.53	0.00	33.346	0.000	25.92	211.9	0.450	3.19	4.65	0.00	
200	7.86	0.02	33.824	0.004	26.39	167.6	0.545	4.88	3.68	0.03	1.01
250	7.45	0.02	33.949	0.003	26.55	153.3	0.626	6.74	3.65	0.01	0.86
300	6.49	0.02	33.942	0.002	26.68	141.6	0.701	8.83	3.03	0.01	1.06
400	5.56	0.15	34.011	0.013	26.85	125.9	0.836	13.65	1.81	0.05	1.26
500	5.17	0.00	34.114	0.000	26.98	114.7	0.957	19.24	0.86	0.01	0.95
600	4.69	0.01	34.197	0.003	27.10	103.7	1.067	25.44	0.44	0.07	0.68
700	4.30	0.01	34.273	0.001	27.20	94.5	1.167	32.11	0.28	0.03	0.83
800	3.99	0.01	34.332	0.002	27.28	87.4	1.259	39.19	0.24	0.02	0.70
1000	3.50	0.00	34.416	0.000	27.39	77.1	1.426	54.50	0.30	0.00	0.98
1200	3.09	0.01	34.478	0.003	27.48	69.2	1.574	71.21	0.49	0.02	0.90
1500	2.59	0.00	34.543	0.000	27.58	60.5	1.771	98.45	0.92	0.00	12.63

CNAV OSHAWA CRUISE OS2 STATION 040 OBSERVED VALUES

DATE 30/05/63 HR 00.1 LAT 39-10 N LONG 127-55 W SNDG 4388 WEA 02 WIND VEL 0 DIR 00
BAROM 22.0 TEMP DRY 18.9 WET 16.7 RELHU 80 WTRCLR SECDI SEA 0 DIR 00 SWELL 1 DIR 01
CLOUD TYPE AMT 6 VIS 7 WIRE ANGLE(S) 5,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	14.73	32.748	24.32	5.94	0.531	-0.028	106
1	5	13.81	32.749	24.51	5.99	0.535	-0.023	105
1	10	13.52	32.750	24.57	6.07	0.542	-0.027	105
1	20	13.20	32.750	24.63	6.12	0.547	-0.028	105
1	30	13.13	32.753	24.65	6.08	0.543	-0.024	105
1	50	11.76	32.733	24.90	6.32	0.564	-0.030	106
1	75	10.96	32.704	25.02	6.27	0.560	-0.016	103
1	100	10.01	32.953	25.37	5.40	0.482	0.072	87
1	125	8.95	33.213	25.75	4.87	0.435	0.132	77
1	150	8.38	33.475	26.04	4.55	0.406	0.167	71
1	175	8.04	33.762	26.32	4.23	0.378	0.199	66
2	187	8.00	33.858	26.40	3.91	0.349	0.228	61
2	233	7.33	33.957	26.57	3.45	0.308	0.278	53
2	278	6.60	33.957	26.67	2.93	0.262	0.335	44
2	466	5.11	34.052	26.93	1.36	0.121	0.497	20
2	697	4.44	34.284	27.19	0.31	0.028	0.600	4
2	935	3.86	34.421	27.36	0.31	0.028	0.608	4
2	1415	2.73	34.544	27.57	0.80	0.071	0.583	11
2	1708	2.25	34.612	27.66	1.32	0.118	0.544	18

CNAV OSHAWA CRUISE OS2 STATION 040 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.02	0.04		32.737
11	0.03	0.06		32.746
36	0.09	0.06		32.733
70	0.21	0.08		32.685
100	0.13	0.02		32.938
	6.85	4.49	- WATER COLUMN VALUES	

MESSENGER TIME 1642 INCOMING SOLAR RADIATION - AM 223 PM 252

CNAV OSHAWA CRUISE OS2 STATION 040 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.73	0.00	32.748	0.000	24.32	361.7	0.000	0.00	5.94	0.00	
10	13.52	0.00	32.750	0.000	24.57	337.9	0.036	0.02	6.07	0.00	
20	13.20	0.00	32.750	0.000	24.63	332.1	0.069	0.07	6.12	0.00	
30	13.13	0.00	32.753	0.000	24.65	330.8	0.103	0.16	6.08	0.00	
50	11.76	0.00	32.733	0.000	24.90	307.7	0.167	0.42	6.32	0.00	
75	10.96	0.00	32.704	0.000	25.02	296.5	0.243	0.90	6.27	0.00	
100	10.01	0.00	32.953	0.000	25.37	262.9	0.314	1.53	5.40	0.00	
150	8.38	0.00	33.475	0.000	26.04	200.1	0.430	2.99	4.55	0.00	
200	7.77	0.03	33.911	0.010	26.47	159.8	0.521	4.59	3.84	0.04	0.95
250	7.05	0.01	33.962	0.004	26.62	146.8	0.598	6.37	3.25	0.00	0.63
300	6.34	0.03	33.962	0.001	26.71	138.1	0.670	8.40	2.70	0.01	1.20
400	5.44	0.06	34.005	0.002	26.86	124.9	0.803	13.14	1.82	0.01	1.17
500	4.97	0.02	34.085	0.005	26.98	114.3	0.924	18.69	1.14	0.00	0.84
600	4.64	0.05	34.185	0.009	27.09	104.0	1.034	24.90	0.63	0.00	0.67
700	4.43	0.00	34.286	0.000	27.19	95.1	1.135	31.61	0.31	0.00	0.98
800	4.18	0.00	34.353	0.002	27.27	88.1	1.227	38.73	0.23	0.04	0.62
1000	3.69	0.01	34.444	0.004	27.40	77.3	1.395	54.12	0.34	0.00	0.94
1200	3.21	0.02	34.502	0.008	27.49	68.8	1.543	70.80	0.51	0.01	0.88
1500	2.57	0.00	34.560	0.001	27.59	58.9	1.737	97.59	0.94	0.00	9.86

CNAV OSHAWA CRUISE OS2 STATION 041 OBSERVED VALUES

DATE 30/05/63 HR 06.4 LAT 38-54 N LONG 126-50 W SNDG 4206 WEA 41 WIND VEL 0 DIR 00
BAROM 22.0 TEMP DRY 13.3 WET 12.8 RELHU 95 WTRCLR SECDI SEA 0 DIR 00 SWELL 1 DIR 24
CLOUD TYPE AMT VIS 5 WIRE ANGLE(S) 2, 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	14.02	32.682	24.41	5.90	0.527	-0.017	103
1	5	13.97	32.692	24.43	6.06	0.541	-0.031	106
1	10	13.42	32.675	24.53	6.06	0.541	-0.025	105
1	20	13.16	32.676	24.58	6.12	0.547	-0.028	105
1	30	13.14	32.683	24.59	6.13	0.547	-0.028	105
1	50	11.34	32.641	24.90	6.40	0.572	-0.032	106
1	75	10.49	32.728	25.12	5.89	0.526	0.023	96
1	100	9.43	33.106	25.59	5.02	0.448	0.113	80
1	125	8.61	33.763	26.23	3.34	0.298	0.271	52
1	150	8.46			3.79	0.338		
1	176	8.28	33.874	26.37	2.92	0.261	0.312	45
2	194	7.97	33.935	26.46	2.72	0.243	0.334	42
2	243	7.19	34.004	26.63	2.39	0.213	0.374	36
2	291	6.73	34.024	26.71	1.99	0.178	0.416	30
2	490	5.35	34.154	26.99	0.82	0.073	0.541	12
2	730	4.48	34.332	27.23	0.36	0.032	0.594	5
2	974	3.74	34.434	27.38	0.36	0.032	0.606	5
2	1463	2.68	34.538	27.57	0.84	0.075	0.580	11
2	1755	2.45	34.587	27.63	1.36	0.121	0.537	18

CNAV OSHAWA CRUISE OS2 STATION 041 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.06	0.20		32.669
11	0.00	0.05		32.662
36	0.07	0.21		32.662
70	0.16	0.06		32.670
100	0.08	0.02		33.080
	5.01	9.09	- WATER COLUMN VALUES	

MESSENGER TIME 2203 INCOMING SOLAR RADIATION - AM 223 PM 252

CNAV OSHAWA CRUISE OS2 STATION 041 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.02	0.00	32.682	0.000	24.41	352.4	0.000	0.00	5.90	0.00	
10	13.42	0.00	32.675	0.000	24.53	341.5	0.035	0.02	6.06	0.00	
20	13.16	0.00	32.676	0.000	24.58	336.7	0.070	0.07	6.12	0.00	
30	13.14	0.00	32.683	0.000	24.59	336.1	0.103	0.16	6.13	0.00	
50	11.34	0.00	32.641	0.000	24.90	307.1	0.168	0.42	6.40	0.00	
75	10.49	0.00	32.728	0.000	25.12	286.9	0.243	0.90	5.89	0.00	
100	9.43	0.00	33.106	0.000	25.59	242.4	0.310	1.49	5.02	0.00	
150	8.46	0.00	33.915	0.073	26.37	168.7	0.413	2.77	3.79	0.00	1.13
200	7.86	0.00	33.949	0.002	26.49	158.4	0.496	4.25	2.67	0.01	1.02
250	7.11	0.01	34.008	0.001	26.64	144.3	0.572	6.00	2.33	0.00	0.83
300	6.65	0.00	34.029	0.000	26.72	137.3	0.643	8.00	1.92	0.00	1.08
400	5.88	0.01	34.090	0.002	26.87	124.1	0.775	12.71	1.26	0.00	1.30
500	5.30	0.00	34.162	0.001	27.00	112.7	0.895	18.21	0.79	0.00	0.95
600	4.89	0.03	34.239	0.004	27.11	103.0	1.003	24.35	0.52	0.02	0.67
700	4.56	0.01	34.311	0.002	27.20	94.7	1.103	31.01	0.38	0.01	0.84
800	4.25	0.00	34.367	0.002	27.28	87.9	1.196	38.11	0.33	0.01	0.70
1000	3.67	0.00	34.442	0.001	27.40	77.2	1.363	53.47	0.37	0.00	0.97
1200	3.16	0.01	34.492	0.004	27.49	69.0	1.511	70.16	0.51	0.01	0.89
1500	2.63	0.00	34.544	0.000	27.58	60.9	1.709	97.47	0.90	0.00	11.91

CNAV OSHAWA CRUISE OS2 STATION 41A BIOLOGICAL DATA

DATE 30/05/63 LAT 38-38 N LONG 125-58 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.02	0.09	0.90	32.927

MESSENGER TIME 0432 INCOMING SOLAR RADIATION - AM 257 PM 191

CNAV OSHAWA CRUISE OS2 STATION 042 OBSERVED VALUES

DATE 30/05/63 HR 14.1 LAT 38-35 N LONG 125-40 W SNDG 3931 WEA 02 WIND VEL 8 DIR 36
BAROM 20.0 TEMP DRY 13.3 WET 12.8 RELHU 95 WTRCLR SECDI SEA 0 DIR 00 SWELL 0 DIR 00
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 9,10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.48	32.822	24.63	5.97	0.533	-0.018	104
1	5	13.46	32.818	24.63	5.89	0.526	-0.011	102
1	10	13.47	32.808	24.62	6.07	0.542	-0.027	105
1	20	13.39	32.809	24.64	5.92	0.529	-0.013	102
1	30	13.27	32.814	24.67	6.05	0.540	-0.023	104
1	50	13.16	32.852	24.72	6.00	0.536	-0.018	103
1	75	11.86	32.893	25.00	5.97	0.533	-0.001	100
1	100	10.71	33.122	25.39	5.79	0.517	0.028	95
1	125	9.98	33.352	25.69	4.60	0.411	0.143	74
1	150	9.64	33.648	25.98	3.66	0.327	0.230	59
1	175	8.58	33.686	26.18	3.63	0.324	0.246	57
1	200	8.53	33.867	26.33	3.19	0.285	0.285	50
1	250	7.47	33.953	26.55	3.63	0.324	0.260	56
1	300	6.74	33.958	26.66	3.12	0.279	0.316	47
2	493	5.27	34.119	26.97	0.86	0.077	0.538	12
2	739	4.48	34.338	27.23	0.35	0.031	0.595	5
2	988	3.71	34.442	27.39	0.43	0.038	0.600	6
2	1487	2.75	34.550	27.57	0.91	0.081	0.573	12
2	1984	2.01	34.602	27.67	1.49	0.133	0.533	20
2	2482	1.77	34.641	27.72	2.11	0.188	0.483	28
2	2980	1.61	34.673	27.76	2.56	0.229	0.444	34
2	3530	1.55	34.677	27.77	2.90	0.259	0.415	38

CNAV OSHAWA CRUISE OS2 STATION 042 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.05	0.13		32.811
11	0.02	0.17		32.808
36	0.07	0.26		32.823
70	0.04	0.13		32.813
	3.38	13.60	- WATER COLUMN VALUES	

MESSENGER TIME 0616 INCOMING SOLAR RADIATION - AM 257 PM 191

CNAV OSHAWA CRUISE OS2 STATION 042 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.48	0.00	32.822	0.000	24.63	331.6	0.000	0.00	5.97	0.00	
10	13.47	0.00	32.808	0.000	24.62	332.7	0.034	0.02	6.07	0.00	
20	13.39	0.00	32.809	0.000	24.64	331.4	0.067	0.07	5.92	0.00	
30	13.27	0.00	32.814	0.000	24.67	328.9	0.101	0.15	6.05	0.00	
50	13.16	0.00	32.852	0.000	24.72	324.5	0.166	0.42	6.00	0.00	
75	11.86	0.00	32.893	0.000	25.00	298.2	0.245	0.92	5.97	0.00	
100	10.71	0.00	33.122	0.000	25.39	262.0	0.315	1.55	5.79	0.00	
150	9.64	0.00	33.648	0.000	25.98	206.6	0.434	3.03	5.66	0.00	
200	8.53	0.00	33.867	0.000	26.33	174.2	0.530	4.74	3.19	0.00	
250	7.47	0.00	33.953	0.000	26.55	153.3	0.612	6.63	3.63	0.00	
300	6.74	0.00	33.958	0.000	26.66	143.7	0.687	8.74	3.12	0.00	
400	5.80	0.06	34.027	0.009	26.83	127.7	0.824	13.63	1.88	0.09	1.24
500	5.24	0.01	34.126	0.000	26.98	114.6	0.946	19.25	0.82	0.01	0.97
600	4.85	0.05	34.220	0.005	27.10	103.9	1.057	25.46	0.44	0.08	0.69
700	4.56	0.03	34.307	0.003	27.20	95.1	1.157	32.16	0.32	0.05	0.80
800	4.28	0.01	34.370	0.002	27.28	88.0	1.250	39.28	0.34	0.02	0.73
1000	3.68	0.00	34.446	0.000	27.40	77.0	1.417	54.64	0.44	0.00	0.99
1200	3.24	0.02	34.499	0.003	27.49	69.4	1.565	71.36	0.60	0.01	0.82
1500	2.73	0.00	34.552	0.000	27.57	61.4	1.764	98.86	0.92	0.00	0.96
2000	2.00	0.00	34.603	0.000	27.68	51.4	2.051	149.92	1.51	0.00	0.95
2500	1.76	0.00	34.642	0.000	27.73	47.4	2.302	208.14	2.13	0.00	0.95
3000	1.61	0.00	34.674	0.000	27.76	44.7	2.537	274.85	2.58	0.00	5.21

CNAV OSHAWA CRUISE 052 STATION 043 OBSERVED VALUES

DATE 30/05/63 HR 19.2 LAT 38-28 N LONG 125-12 W SNDG 3657 WEA 01 WIND VEL 10 DIR 31
BAROM 22.0 TEMP DRY 17.2 WET 15.0 RELHU 79 WTRCLR SECDI 30 SEA 1 DIP 31 SWELL 1 DIR 35
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 9,23,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	13.34	32.534	24.44	6.07	0.542	-0.025	105
1	5	13.11	32.541	24.49	6.12	0.547	-0.027	105
1	10	13.09	32.539	24.49	6.16	0.550	-0.030	106
1	20	13.03	32.550	24.51	6.16	0.550	-0.029	106
1	30	12.94	32.561	24.54	6.12	0.547	-0.025	105
1	50	12.45	32.686	24.73	6.13	0.547	-0.021	104
1	74	11.16	32.970	25.19	5.66	0.506	0.035	94
1	99	9.86	33.268	25.65	5.03	0.449	0.106	81
1	124	9.27	33.480	25.91	4.39	0.392	0.170	70
1	149	8.70	33.729	26.19	3.74	0.334	0.234	59
1	173	8.28	33.889	26.38	3.24	0.289	0.284	50
2	182	8.34	34.009	26.47	2.34	0.209	0.363	37
2	230	7.90	34.063	26.57	2.15	0.192	0.386	33
2	275	7.48	34.086	26.65	1.76	0.157	0.426	27
2	460	5.78	34.168	26.94	0.77	0.069	0.539	11
2	692	4.75	34.318	27.19	0.27	0.024	0.598	4
2	933	3.97	34.453	27.38	0.35	0.031	0.603	5
2	1423	2.79	34.545	27.56	0.85	0.076	0.577	12
3	1642	2.46			2.44	0.218		

CNAV OSHAWA CRUISE OS2 STATION 043 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	IRRAD	SAL
0	0.05	0.08	1.58	0.36	100		32.538
				0.30	75		
				0.26	55		
				0.17	37		
				0.07	19		
				0.01	6		
8	0.04	0.23	2.02			50	32.540
29	0.06	0.22	0.50			10	32.560
64	0.25	0.33	0.06			1	32.754
100	0.16	0.05					33.211
150	0.07						33.670
200	0.04						33.996
	6.59	15.60	50.66	- WATER COLUMN VALUES			

MESSENGER TIME 1144 INCOMING SOLAR RADIATION - AM 257 PM 191

LIGHT SATURATION INCUBATOR ILLUMINATION 18300

CNAV OSHAWA CRUISE OS2 STATION 043 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.34	0.00	32.534	0.000	24.44	350.1	0.000	0.00	6.07	0.00	
10	13.09	0.00	32.539	0.000	24.49	345.3	0.036	0.02	6.16	0.00	
20	13.03	0.00	32.550	0.000	24.51	343.6	0.070	0.07	6.16	0.00	
30	12.94	0.00	32.561	0.000	24.54	341.3	0.105	0.16	6.12	0.00	
50	12.45	0.00	32.686	0.000	24.73	323.5	0.172	0.43	6.13	0.00	
75	11.10	0.00	32.983	0.000	25.21	278.3	0.247	0.91	5.64	0.00	0.94
100	9.83	0.00	33.277	0.001	25.66	236.1	0.312	1.49	5.00	0.00	0.94
150	8.68	0.00	33.739	0.001	26.20	185.1	0.418	2.82	3.70	0.01	0.96
200	8.08	0.06	34.020	0.008	26.51	156.3	0.504	4.35	2.50	0.14	0.92
250	7.71	0.00	34.075	0.001	26.61	147.7	0.581	6.11	1.99	0.01	0.59
300	7.23	0.01	34.097	0.001	26.70	140.0	0.654	8.16	1.58	0.01	1.22
400	6.29	0.03	34.141	0.002	26.86	125.5	0.788	12.94	1.01	0.02	1.12
500	5.55	0.02	34.193	0.002	26.99	113.5	0.908	18.49	0.63	0.01	0.82
600	5.07	0.04	34.257	0.003	27.10	103.9	1.018	24.67	0.39	0.01	0.67
700	4.72	0.00	34.323	0.000	27.19	95.8	1.119	31.40	0.27	0.00	0.96
800	4.37	0.01	34.383	0.001	27.28	88.1	1.212	38.55	0.26	0.02	0.61
1000	3.77	0.00	34.483	0.001	27.42	75.4	1.377	53.74	0.28	0.07	8.94
1200	3.26	0.00	34.544	0.003	27.52	66.3	1.521	69.91	0.33	0.16	13.09
1500	2.66	0.00							1.26	0.02	7.38

CNAV OSHAWA CRUISE OS2 STATION 044 OBSERVED VALUES

DATE 31/05/63 HR 02.5 LAT 38-17 N LONG 124-28 W SNDG 3773 WEA 02 WIND VEL 16 DIR 32
BAROM 20.0 TEMP DRY 13.3 WET 13.3 RELHU 99 WTRCLR SECDI SEA 2 DIR 32 SWELL 2 DIR 36
CLOUD TYPE AMT 9 VIS 3 WIRE ANGLE(S) 22, 8

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	13.64	33.014	24.75	6.07	0.542	-0.030	106
1	5	13.63	33.013	24.75	6.01	0.537	-0.024	105
1	9	13.62	33.014	24.75	6.14	0.548	-0.036	107
1	19	12.81	33.019	24.92	6.24	0.557	-0.036	107
1	28	11.54	33.203	25.30	5.31	0.474	0.061	89
1	46	10.12	33.463	25.75	4.32	0.386	0.165	70
1	70	9.77	33.583	25.91	3.84	0.343	0.212	62
1	93	9.25	33.731	26.11	3.38	0.302	0.259	54
1	116	8.90	33.897	26.29	2.83	0.253	0.312	45
1	139	8.61	33.984	26.40	2.60	0.232	0.336	41
1	163	8.28	34.012	26.48	2.37	0.212	0.361	37
2	194	7.59	33.986	26.56	2.92	0.261	0.321	45
2	243	6.99	34.009	26.66	2.49	0.222	0.368	38
2	292	6.47	34.030	26.75	1.94	0.173	0.424	29
2	486	5.41	34.216	27.03	0.58	0.052	0.561	8
2	728	4.45	34.359	27.25	0.27	0.024	0.603	4
2	972	3.72	34.440	27.39	0.43	0.038	0.600	6
2	1465	2.78	34.546	27.56	0.90	0.080	0.573	12
2	1759	2.27	34.587	27.64	1.32	0.118	0.544	18

CNAV OSHAWA CRUISE OS2 STATION 044 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.33	0.27		33.010
6	0.30			33.011
22	0.56	0.63		33.006
43	0.22	0.29		33.288
100	0.12	0.03		33.750
	16.87	19.48	- WATER COLUMN VALUES	

MESSENGER TIME 1839 INCOMING SOLAR RADIATION - AM 257 PM 191

CNAV OSHAWA CRUISE OS2 STATION 044 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.64	0.00	33.014	0.000	24.75	320.6	0.000	0.00	6.07	0.00	
10	13.58	0.01	33.010	0.003	24.76	320.0	0.033	0.02	6.18	0.01	1.00
20	12.67	0.01	33.036	0.003	24.96	301.2	0.064	0.06	6.15	0.02	0.85
30	11.32	0.01	33.239	0.000	25.37	262.3	0.092	0.14	5.16	0.01	0.95
50	10.01	0.05	33.491	0.007	25.79	222.2	0.141	0.33	4.21	0.02	0.84
75	9.66	0.01	33.613	0.000	25.95	208.0	0.195	0.68	3.74	0.00	0.75
100	9.13	0.00	33.785	0.003	26.17	187.6	0.245	1.12	3.20	0.01	0.69
150	8.47	0.01	34.003	0.001	26.44	162.3	0.333	2.24	2.46	0.02	0.63
200	7.50	0.01	33.987	0.001	26.57	150.4	0.412	3.65	2.91	0.03	0.90
250	6.91	0.00	34.012	0.000	26.67	141.3	0.486	5.34	2.41	0.00	0.84
300	6.41	0.01	34.037	0.002	26.76	133.5	0.555	7.29	1.86	0.00	1.06
400	5.77	0.05	34.127	0.009	26.91	119.8	0.683	11.86	1.04	0.01	1.23
500	5.35	0.00	34.226	0.000	27.04	108.4	0.798	17.16	0.53	0.01	0.93
600	4.92	0.01	34.293	0.002	27.15	99.3	0.903	23.07	0.31	0.04	0.67
700	4.54	0.00	34.347	0.001	27.23	91.9	1.000	29.51	0.25	0.02	0.85
800	4.21	0.00	34.387	0.002	27.30	85.9	1.090	36.43	0.29	0.01	0.69
1000	3.66	0.01	34.448	0.000	27.40	76.6	1.254	51.57	0.45	0.00	0.97
1200	3.23	0.03	34.497	0.001	27.48	69.5	1.402	68.26	0.62	0.00	0.90
1500	2.72	0.00	34.551	0.000	27.57	61.4	1.601	95.78	0.94	0.00	12.15

CNAV OSHAWA CRUISE OS2 STATION 045 OBSERVED VALUES

DATE 31/05/63 HR 10.1 LAT 38-00 N LONG 123-20 W SNDG 102 WEA 02 WIND VEL 24 DIR 31
BAROM 17.0 TEMP DRY 11.1 WET 11.1 RELHU 99 WTRCLR SECDI SEA 3 DIR 31 SWELL 1 DIR 35
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	10.84	33.365	25.55	5.90	0.527	0.016	97
1	5	10.84	33.370	25.56	6.34	0.566	-0.023	104
1	10	10.86	33.367	25.55	6.37	0.569	-0.026	105
1	20	10.76	33.382	25.58	6.33	0.565	-0.022	104
1	30	9.86	33.600	25.90	5.08	0.454	0.100	82
1	49	9.42	33.651	26.02	3.81	0.340	0.219	61
1	74	8.77	33.888	26.30	2.87	0.256	0.310	45

CNAV OSHAWA CRUISE OS2 STATION 045 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	9.39	36.23		33.370
2	9.15	32.55		33.367
7	9.93	29.53		33.371
14	9.38	32.61		33.376
	133.84	441.51	- WATER COLUMN VALUES	

MESSENGER TIME 0224

CNAV OSHAWA CRUISE OS2 STATION 045

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	INTERPOLATED AND COMPUTED VALUES					
						SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.84	0.00	33.365	0.000	25.55	244.1	0.000	0.00	5.90	0.00	
10	10.86	0.00	33.367	0.000	25.55	244.5	0.025	0.01	6.37	0.00	
20	10.76	0.00	33.382	0.000	25.58	241.9	0.050	0.05	6.33	0.00	
30	9.86	0.00	33.600	0.000	25.90	211.3	0.072	0.11	5.08	0.00	
50	9.42	0.01	33.762	0.070	26.10	192.8	0.113	0.27	3.77	0.00	13.22

CNAV OSHAWA CRUISE OS2 STATION 046 OBSERVED VALUES

DATE 4/06/63 HR 21.5 LAT 39-26 N LONG 125-07 W SNDG 3017 WEA 00 WIND VEL 22 DIR 34
BAROM 20.0 TEMP DRY 15.0 WET 14.4 RELHU 94 WTRCLR SECDI SEA 4 DIR 99 SWELL 4 DIR 34
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 20,20

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.84	32.935	24.65	5.96	0.532	-0.022	104
1	5	13.82	32.937	24.65	5.98	0.534	-0.023	105
1	9	13.82	32.920	24.64	5.92	0.529	-0.018	103
1	19	13.80	32.934	24.65	5.92	0.529	-0.018	103
1	29	13.79	32.975	24.69	5.99	0.535	-0.024	105
1	48	13.77	32.927	24.65	6.00	0.536	-0.024	105
1	72	13.61	32.911	24.68	5.99	0.535	-0.022	104
1	96	11.71	32.951	25.07	5.81	0.519	0.015	97
1	119	10.39	33.173	25.48	5.29	0.472	0.077	86
1	143	9.14	33.406	25.87	4.72	0.422	0.142	75
1	168	8.80	33.630	26.10	4.23	0.378	0.190	67
2	192	8.71	33.653	26.13	4.27	0.381	0.187	67
2	240	8.44	33.963	26.41	3.16	0.282	0.289	49
2	276	7.46	33.990	26.58	3.14	0.280	0.303	48
2	479	5.42	34.046	26.89	1.48	0.132	0.481	22
2	715	4.49	34.281	27.18	0.31	0.028	0.599	4
2	950	3.84	34.416	27.36	0.37	0.033	0.603	5
2	1419	2.80	34.537	27.56	0.82	0.073	0.580	11
2	1599	2.32	34.581	27.63	1.24	0.111	0.550	17

CNAV OSHAWA CRUISE OS2 STATION 046 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	SAL
0	0.07	0.12		0.16	100	32.930
				0.13	75	
				0.09	55	
				0.21	37	
				0.01	19	
				0.00	6	
11	0.10	0.11				32.933
35	0.11	0.10				32.948
71	0.14	0.13				32.932
100	0.06	0.03				32.933
	8.05	8.12	- WATER COLUMN VALUES			

MESSENGER TIME 1345 INCOMING SOLAR RADIATION - AM 181 PM 147

LIGHT SATURATION INCUBATOR ILLUMINATION 18800

CNAV OSHAWA CRUISE OS2 STATION 046 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.84	0.00	32.935	0.000	24.65	330.3	0.000	0.00	5.96	0.00	
10	13.82	0.00	32.919	0.001	24.64	331.3	0.034	0.02	5.91	0.00	1.00
20	13.80	0.00	32.939	0.001	24.66	329.7	0.067	0.07	5.93	0.00	0.87
30	13.79	0.00	32.974	0.002	24.69	327.2	0.100	0.15	5.99	0.00	0.97
50	13.79	0.02	32.924	0.000	24.65	331.5	0.167	0.43	6.00	0.00	0.91
75	13.41	0.04	32.909	0.003	24.71	325.6	0.249	0.96	5.98	0.00	0.84
100	11.46	0.01	32.983	0.004	25.15	285.0	0.326	1.64	5.73	0.01	0.78
150	8.98	0.02	33.480	0.006	25.95	208.8	0.451	3.19	4.55	0.01	0.72
200	8.71	0.02	33.703	0.015	26.17	189.0	0.551	4.98	4.10	0.07	0.93
250	8.19	0.03	33.980	0.006	26.47	161.7	0.639	7.01	3.12	0.03	0.68
300	7.03	0.08	33.997	0.005	26.65	144.8	0.717	9.18	3.00	0.06	1.40
400	5.79	0.19	34.026	0.012	26.83	127.7	0.854	14.08	2.25	0.13	1.71
500	5.30	0.02	34.065	0.004	26.92	119.8	0.979	19.84	1.33	0.01	0.89
600	4.83	0.05	34.161	0.012	27.05	108.1	1.094	26.32	0.75	0.02	0.66
700	4.52	0.01	34.265	0.003	27.17	97.7	1.198	33.24	0.35	0.00	0.91
800	4.23	0.01	34.338	0.002	27.26	89.8	1.293	40.53	0.25	0.04	0.65
1000	3.71	0.00	34.435	0.002	27.39	78.2	1.463	56.16	0.40	0.00	0.95
1200	3.25	0.00	34.496	0.006	27.48	69.7	1.613	73.04	0.56	0.01	0.88
1500	2.65	0.00	34.549	0.001	27.58	60.7	1.811	100.43	0.93	0.00	9.57

CNAV OSHAWA CRUISE OS2 STATION 46A BIOLOGICAL DATA

DATE 4/06/63 LAT 38-50 N LONG 124-25 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.57	1.62	17.22	33.123

MESSENGER TIME 0350 INCOMING SOLAR RADIATION - AM 181 PM 147

CNAV OSHAWA CRUISE OS2 STATION 46B BIOLOGICAL DATA

DATE 4/06/63 LAT 39-22 N LONG 125-05 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL	PHOS	NITR	SIL
0	0.11	0.16	2.90	32.948	0.60	0.6	2

MESSENGER TIME 1210 INCOMING SOLAR RADIATION - AM 181 PM 147

CNAV OSHAWA CRUISE OS2 STATION 047 OBSERVED VALUES

DATE 5/06/63 HR 05.5 LAT 39-50 N LONG 126-08 W SNDG 4279 WEA 02 WIND VEL 26 DIR 34
BAROM 19.0 TEMP DRY 14.4 WET 13.9 RELHU 95 WTRCLR SECDI SEA 4 DIR 34 SWELL 4 DIR 34
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 8,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.63	32.774	24.57	6.12	0.547	-0.033	106
1	5	13.62	32.760	24.56	6.00	0.536	-0.022	104
1	10	13.64	32.762	24.55	6.07	0.542	-0.029	106
1	20	13.63	32.769	24.56	6.04	0.539	-0.026	105
1	30	13.58	32.768	24.57	6.06	0.541	-0.027	105
1	50	13.51	32.771	24.59	6.08	0.543	-0.028	105
1	74	10.75	32.946	25.24	5.85	0.522	0.023	96
1	99	9.05	33.449	25.92	4.19	0.374	0.191	66
1	124	8.39	33.676	26.20	3.73	0.333	0.239	58
1	149	8.09	33.873	26.40	3.01	0.269	0.307	47
1	174	7.72	33.955	26.52	2.72	0.243	0.338	42
2	190	7.26	33.971	26.59	2.65	0.237	0.350	40
2	239	6.83	34.029	26.70	1.95	0.174	0.418	29
2	287	6.44	34.060	26.78	1.56	0.139	0.459	23
2	478	4.96	34.120	27.00	0.81	0.072	0.548	12
2	718	4.40	34.331	27.23	0.30	0.027	0.601	4
2	956	3.52	34.418	27.39	0.39	0.035	0.607	5
2	1440	2.66	34.540	27.57	0.85	0.076	0.580	12
2	1733	2.15	34.592	27.65	1.37	0.122	0.542	18

CNAV OSHAWA CRUISE OS2 STATION 047 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.07	0.04		32.780
11	0.08	0.11		32.768
35	0.08	0.07		32.771
71	0.17	0.16		32.776
	7.24	7.17	- WATER COLUMN VALUES	

MESSENGER TIME 2132 INCOMING SOLAR RADIATION - AM 181 PM 147

CNAV OSHAWA CRUISE OS2 STATION 047 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.63	0.00	32.774	0.000	24.57	338.0	0.000	0.00	6.12	0.00	
10	13.64	0.00	32.762	0.000	24.55	339.4	0.035	0.02	6.07	0.00	
20	13.63	0.00	32.769	0.000	24.56	338.9	0.069	0.07	6.04	0.00	
30	13.58	0.00	32.768	0.000	24.57	338.3	0.103	0.16	6.06	0.00	
50	13.51	0.00	32.771	0.000	24.59	337.2	0.171	0.44	6.08	0.00	
75	10.66	0.00	32.966	0.004	25.27	272.2	0.248	0.92	5.79	0.02	0.94
100	9.01	0.00	33.461	0.002	25.93	209.7	0.308	1.46	4.16	0.01	0.94
150	8.08	0.00	33.878	0.000	26.40	165.9	0.403	2.64	2.99	0.00	0.94
200	7.11	0.04	33.983	0.001	26.62	145.3	0.481	4.04	2.52	0.03	1.10
250	6.74	0.00	34.038	0.001	26.72	137.1	0.553	5.68	1.84	0.01	0.75
300	6.32	0.01	34.064	0.002	26.79	130.3	0.620	7.58	1.48	0.01	1.11
400	5.50	0.03	34.096	0.008	26.92	118.9	0.746	12.07	1.02	0.04	1.20
500	4.89	0.02	34.139	0.004	27.03	109.4	0.861	17.38	0.74	0.00	0.90
600	4.61	0.07	34.226	0.011	27.13	100.6	0.967	23.35	0.48	0.01	0.67
700	4.42	0.02	34.315	0.003	27.22	92.8	1.065	29.87	0.32	0.00	0.90
800	4.10	0.02	34.369	0.004	27.30	85.9	1.155	36.82	0.29	0.02	0.65
1000	3.42	0.02	34.432	0.000	27.41	75.0	1.318	51.79	0.41	0.00	0.96
1200	3.01	0.05	34.487	0.001	27.50	67.6	1.463	68.08	0.57	0.01	0.89
1500	2.57	0.01	34.552	0.000	27.59	59.7	1.656	94.83	0.94	0.00	11.23

CNAV OSHAWA CRUISE OS2 STATION 47A BIOLOGICAL DATA

DATE 5/06/63 LAT 40-09 N LONG 127-15 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.08	0.30	4.94	32.535

MESSENGER TIME 0413 INCOMING SOLAR RADIATION - AM 242 PM 250

CNAV OSHAWA CRUISE OS2 STATION 048 OBSERVED VALUES

DATE 5/06/63 HR 13.2 LAT 40-13 N LONG 127-18 W SNDG WEA 02 WIND VEL 36 DIR 01
BAROM 21.0 TEMP DRY 12.2 WET 11.7 RELHU 94 WTRCLR SECDI SEA 4 DIR 01 SWELL 4 DIR 34
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.97	32.475	24.27	5.90	0.527	-0.016	103
1	5	13.93	32.475	24.27	5.92	0.529	-0.017	103
1	10	13.94	32.494	24.29	5.94	0.531	-0.019	104
1	20	13.89	32.481	24.29	6.01	0.537	-0.025	105
1	30	12.99	32.592	24.55	6.19	0.553	-0.032	106
1	50	11.59	32.661	24.87	6.27	0.560	-0.023	104
1	75	10.47	32.790	25.17	5.73	0.512	0.038	93
1	100	9.30	33.175	25.66	4.87	0.435	0.128	77
1	125	8.46	33.451	26.01	4.19	0.374	0.198	65
1	150	8.13	33.782	26.32	3.42	0.305	0.270	53
1	175	7.73	33.909	26.48	3.09	0.276	0.305	48

CNAV OSHAWA CRUISE OS2 STATION 048 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	SAL
0	0.09	0.20		0.35	100	32.492
				0.29	66	
				0.26	50	
				0.30	33	
				0.09	18	
				0.01	6	
11	0.08	0.19				32.491
35	0.16	0.25				32.609
71	0.46	0.19				32.753
100	0.10	0.00				33.224
	15.07	15.57	- WATER COLUMN VALUES			

MESSENGER TIME 0527 INCOMING SOLAR RADIATION - AM 242 PM 250

LIGHT SATURATION INCUBATOR ILLUMINATION 18700

CNAV OSHAWA CRUISE OS2 STATION 048 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.97	0.00	32.475	0.000	24.27	366.6	0.000	0.00	5.90	0.00	
10	13.94	0.00	32.494	0.000	24.29	364.9	0.037	0.02	5.94	0.00	
20	13.89	0.00	32.481	0.000	24.29	365.1	0.074	0.08	6.01	0.00	
30	12.99	0.00	32.592	0.000	24.55	340.0	0.110	0.17	6.19	0.00	
50	11.59	0.00	32.661	0.000	24.87	310.0	0.175	0.43	6.27	0.00	
75	10.47	0.00	32.790	0.000	25.17	282.0	0.250	0.91	5.73	0.00	
100	9.30	0.00	33.175	0.000	25.66	235.3	0.315	1.48	4.87	0.00	
150	8.13	0.00	33.782	0.000	26.32	173.8	0.418	2.77	3.42	0.00	

CNAV OSHAWA CRUISE OS2 STATION 48A BIOLOGICAL DATA

DATE 5/06/63 LAT 40-51 N LONG 127-01 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL	PHOS	NITR	SIL
0	0.07	0.70	2.44	32.585	0.64	0.1	2

MESSENGER TIME 1205 INCOMING SOLAR RADIATION - AM 242 PM 250

CNAV OSHAWA CRUISE OS2 STATION 48B BIOLOGICAL DATA

DATE 6/06/63 LAT 41-55 N LONG 127-30 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.19	0.64	6.66	32.739

MESSENGER TIME 0408 INCOMING SOLAR RADIATION - AM 120 PM 231

CNAV OSHAWA CRUISE OS2 STATION 049 OBSERVED VALUES

DATE 6/06/63 HR 18.3 LAT 42-20 N LONG 127-39 W SNDG 2880 WEA 02 WIND VEL 30 DIR 36
BAROM 23.0 TEMP DRY 12.2 WET 9.4 RELHU 70 WTRCLR SECDI SEA 4 DIR 36 SWELL 5 DIR 34
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 8,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	13.22	32.705	24.59	6.19	0.553	-0.035	107
1	5	13.20	32.701	24.60	6.23	0.556	-0.038	107
1	10	13.22	32.699	24.59	6.24	0.557	-0.039	108
1	20	13.21	32.700	24.59	6.31	0.564	-0.045	109
1	30	13.18	32.707	24.60	6.27	0.560	-0.041	108
1	50	11.01	32.838	25.11	6.38	0.570	-0.027	105
1	75	10.28	32.920	25.30	5.52	0.493	0.058	89
1	100	9.50	33.280	25.71	4.46	0.398	0.161	71
1	124	9.11	33.469	25.92	3.95	0.353	0.211	63
1	149	8.45	33.788	26.28	2.87	0.256	0.315	45
1	175	7.27	33.996	26.61	1.98	0.177	0.410	30
2	193	6.63	34.024	26.72	1.74	0.155	0.440	26
2	241	6.12	34.054	26.81	1.47	0.131	0.471	22
2	290	5.79	34.073	26.87	1.22	0.109	0.499	18
2	484	4.82	34.205	27.09	0.48	0.043	0.579	7
2	725	4.04	34.335	27.28	0.27	0.024	0.609	4
2	967	3.56	34.430	27.40	0.35	0.031	0.610	5
2	1452	2.56	34.554	27.59	0.96	0.086	0.571	13
2	1741	2.15	34.595	27.66	1.33	0.119	0.545	18

CNAV OSHAWA CRUISE OS2 STATION 049 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	SAL	PHOS	NITR	SIL
0	0.15	0.42	1.12			32.709	0.53	0.2	0
0	0.19	0.35	3.72			32.702	0.68	0.4	0
33	0.19	0.57	0.00	0.49	100	32.708	1.08		1
				0.25	66				
				0.17	50				
				0.28	33				
				0.16	18				
				0.08	6				
70	0.54	0.17	0.00			32.793	0.97	6.2	6
100	0.13	0.05				33.239	1.58	19.3	23
	19.57	28.26	66.98	- WATER COLUMN VALUES					

MESSENGER TIME 1133 INCOMING SOLAR RADIATION - AM 120 PM 231

LIGHT SATURATION INCUBATOR ILLUMINATION 20200

CNAV OSHAWA CRUISE OS2 STATION 049 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.22	0.00	32.705	0.000	24.59	335.3	0.000	0.00	6.19	0.00	
10	13.22	0.00	32.699	0.000	24.59	336.0	0.034	0.02	6.24	0.00	
20	13.21	0.00	32.700	0.000	24.59	335.9	0.068	0.07	6.31	0.00	
30	13.18	0.00	32.707	0.000	24.60	335.1	0.102	0.16	6.27	0.00	
50	11.01	0.00	32.838	0.000	25.11	286.9	0.165	0.41	6.38	0.00	
75	10.28	0.00	32.920	0.000	25.30	269.3	0.235	0.86	5.52	0.00	
100	9.50	0.00	33.280	0.000	25.71	230.7	0.298	1.42	4.46	0.00	
150	8.41	0.00	33.799	0.000	26.29	176.5	0.400	2.70	2.83	0.00	0.94
200	6.50	0.03	34.031	0.001	26.74	133.7	0.478	4.08	1.68	0.01	1.02
250	6.05	0.00	34.058	0.000	26.82	126.7	0.544	5.59	1.42	0.00	0.80
300	5.73	0.00	34.079	0.001	26.88	121.7	0.607	7.35	1.17	0.00	1.08
400	5.19	0.01	34.144	0.005	27.00	111.5	0.724	11.56	0.74	0.00	1.22
500	4.76	0.00	34.215	0.000	27.10	102.2	0.832	16.53	0.45	0.01	0.92
600	4.40	0.01	34.272	0.000	27.19	94.7	0.932	22.13	0.31	0.02	0.67
700	4.10	0.00	34.323	0.000	27.26	88.5	1.024	28.30	0.27	0.01	0.86
800	3.88	0.01	34.368	0.000	27.32	83.4	1.111	35.00	0.27	0.01	0.68
1000	3.49	0.00	34.441	0.000	27.42	75.1	1.272	49.77	0.38	0.01	0.96
1200	3.06	0.02	34.499	0.001	27.50	67.3	1.416	66.04	0.60	0.02	0.89
1500	2.48	0.00	34.562	0.000	27.60	57.7	1.606	92.27	1.03	0.00	11.42

CNAV OSHAWA CRUISE OS2 STATION 050 OBSERVED VALUES

DATE 7/06/63 HR 01.8 LAT 42-37 N LONG 128-49 W SNDG 3246 WEA 02 WIND VEL 36 DIR 35
BAROM 25.0 TEMP DRY 13.3 WET 11.1 RELHU 77 WTRCLR SECDI SEA 4 DIR 35 SWELL 5 DIR 34
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 30, 6

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	ADU	SATN
1	0	13.13	32.680	24.59	6.15	0.549	-0.030	106
1	4	13.10	32.677	24.60	6.26	0.559	-0.040	108
1	9	13.11	32.677	24.59	6.17	0.551	-0.032	106
1	17	13.09	32.677	24.60	6.22	0.556	-0.036	107
1	26	13.05	32.674	24.61	6.19	0.553	-0.033	106
1	43	10.99	32.643	24.97	6.56	0.586	-0.042	108
1	65	10.56	32.654	25.05	6.22	0.556	-0.007	101
1	87	9.74	32.890	25.37	5.52	0.493	0.065	88
1	109	9.07	33.393	25.87	4.22	0.377	0.188	67
1	130	8.51	33.643	26.15	3.55	0.317	0.254	56
1	152	8.00	33.768	26.33	3.48	0.311	0.267	54
2	200	7.61	33.908	26.49	3.35	0.299	0.283	51
2	249	6.72	33.948	26.65	3.28	0.293	0.302	49
2	299	6.19	33.954	26.72	2.73	0.244	0.358	40
2	499	4.91	34.111	27.00	0.90	0.080	0.540	13
2	749	3.99	34.293	27.25	0.34	0.030	0.604	5
2	999	3.41	34.411	27.40	0.35	0.031	0.612	5
2	1497	2.55	34.545	27.58	0.85	0.076	0.581	12
2	1794	2.12	34.587	27.65	1.32	0.118	0.547	18

CNAV OSHAWA CRUISE OS2 STATION 050 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.09	0.21		32.665
10	0.09	0.20		32.680
33	0.09	0.12		32.660
70	0.07	0.14		32.661
	5.87	10.45	- WATER COLUMN VALUES	

MESSENGER TIME 1800 INCOMING SOLAR RADIATION - AM 120 PM 231

CNAV OSHAWA CRUISE OS2 STATION 050 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.13	0.00	32.680	0.000	24.59	335.4	0.000	0.00	6.15	0.00	
10	13.11	0.00	32.677	0.000	24.59	335.5	0.034	0.02	6.17	0.01	0.90
20	13.12	0.03	32.677	0.000	24.59	335.9	0.068	0.07	6.21	0.01	0.68
30	12.61	0.12	32.667	0.002	24.68	327.5	0.102	0.16	6.28	0.03	0.88
50	10.74	0.11	32.631	0.006	25.00	297.6	0.164	0.41	6.52	0.02	0.73
75	10.20	0.02	32.731	0.002	25.17	282.0	0.237	0.88	5.96	0.01	0.64
100	9.33	0.00	33.186	0.021	25.67	235.0	0.303	1.45	4.75	0.05	0.66
150	8.04	0.00	33.760	0.001	26.32	174.1	0.406	2.74	3.47	0.01	0.84
200	7.61	0.00	33.908	0.000	26.49	157.8	0.489	4.23	3.35	0.00	
250	6.71	0.00	33.948	0.000	26.65	143.3	0.565	5.98	3.27	0.00	0.98
300	6.18	0.00	33.955	0.000	26.73	136.7	0.636	7.97	2.72	0.00	1.01
400	5.43	0.04	33.021	0.009	26.87	123.6	0.767	12.66	1.69	0.03	1.30
500	4.91	0.00	34.112	0.000	27.00	111.6	0.886	18.12	0.90	0.00	1.00
600	4.47	0.02	34.189	0.002	27.11	101.8	0.994	24.18	0.52	0.05	0.69
700	4.13	0.01	34.260	0.001	27.21	93.4	1.092	30.76	0.35	0.04	0.77
800	3.85	0.01	34.321	0.001	27.28	96.6	1.183	37.76	0.31	0.01	0.77
1000	3.41	0.00	34.411	0.000	27.40	76.4	1.348	52.94	0.35	0.00	1.00
1200	3.03	0.01	34.478	0.002	27.49	68.5	1.495	69.49	0.49	0.01	0.90
1500	2.55	0.00	34.546	0.000	27.58	59.8	1.690	96.43	0.85	0.00	12.86

CNAV OSHAWA CRUISE OS2 STATION 051 OBSERVED VALUES

DATE 7/06/63 HR 08.5 LAT 42-48 N LONG 130-00 W SNDG 3346 WEA 02 WIND VEL 10 DIR 32
BAROM 24.0 TEMP DRY 13.3 WET 12.8 RELHU 95 WTRCLR SECDI SEA 2 DIR 32 SWELL 1 DIR 34
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 5,23

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.63	32.714	24.52	6.18	0.552	-0.038	107
1	5	13.63	32.708	24.51	6.22	0.556	-0.042	108
1	10	13.65	32.705	24.51	6.18	0.552	-0.038	107
1	20	13.45	32.703	24.55	6.29	0.562	-0.046	109
1	30	11.03	32.652	24.97	6.99	0.624	-0.081	115
1	50	10.66	32.651	25.03	6.61	0.590	-0.043	108
1	75	10.51	32.645	25.05	6.26	0.559	-0.010	102
1	100	10.16	32.701	25.15	6.04	0.539	0.014	97
1	125	8.41	33.180	25.81	5.34	0.477	0.097	83
1	150	8.06	33.584	26.18	4.79	0.428	0.150	74
1	174	7.78	33.801	26.39	3.89	0.347	0.233	60
2	178	7.87	33.772	26.35	3.96	0.354	0.225	61
2	223	7.35	33.925	26.55	3.38	0.302	0.284	52
2	268	6.59	33.952	26.67	2.90	0.259	0.337	43
2	454	4.99	34.128	27.01	1.43	0.128	0.492	21
2	687	4.03	34.232	27.19	0.39	0.035	0.599	5
2	923	3.47	34.366	27.36	0.30	0.027	0.616	4
2	1401	2.68	34.528	27.56	0.69	0.062	0.594	9
2	1677	2.04	34.596	27.67	1.42	0.127	0.539	19
2	2352	1.78	34.634	27.72	1.90	0.170	0.501	25
2	2832	1.64	34.657	27.75	2.48	0.221	0.451	33
2	3102	1.61	34.672	27.76	2.55	0.228	0.445	34

CNAV OSHAWA CRUISE OS2 STATION 051 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.14	0.26		32.697
10	0.10	0.26		32.695
33	0.09	0.21		32.761
70	0.11	0.19		32.707
	7.06	15.33	- WATER COLUMN VALUES	

MESSENGER TIME 0231 INCOMING SOLAR RADIATION - AM 119 PM 108

CNAV OSHAWA CRUISE OS2 STATION 051 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VCL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.63	0.00	32.714	0.000	24.52	342.5	0.000	0.00	6.18	0.00	
10	13.65	0.00	32.705	0.000	24.51	343.7	0.035	0.02	6.18	0.00	
20	13.45	0.00	32.703	0.000	24.55	340.3	0.070	0.07	6.29	0.00	
30	11.03	0.00	32.652	0.000	24.97	300.6	0.102	0.15	6.99	0.00	
50	10.66	0.00	32.651	0.000	25.03	294.9	0.162	0.40	6.61	0.00	
75	10.51	0.00	32.645	0.000	25.05	293.3	0.236	0.87	6.26	0.00	
100	10.16	0.00	32.701	0.000	25.15	284.0	0.309	1.53	6.04	0.00	
150	8.06	0.00	33.584	0.000	26.18	187.4	0.427	2.99	4.79	0.00	
200	7.59	0.04	33.891	0.019	26.49	158.7	0.515	4.54	3.53	0.09	0.80
250	6.90	0.02	33.948	0.005	26.63	145.8	0.591	6.30	3.08	0.00	0.57
300	6.20	0.04	33.982	0.004	26.74	134.9	0.662	8.30	2.60	0.01	1.28
400	5.29	0.06	34.076	0.006	26.93	117.8	0.790	12.84	1.78	0.01	1.07
500	4.74	0.02	34.153	0.004	27.06	106.6	0.903	18.05	1.15	0.00	0.80
600	4.30	0.03	34.199	0.006	27.14	99.0	1.007	23.90	0.67	0.00	0.68
700	3.99	0.00	34.239	0.001	27.20	93.4	1.104	30.39	0.37	0.01	0.93
800	3.73	0.01	34.297	0.003	27.28	87.0	1.195	37.41	0.27	0.03	0.60
1000	3.32	0.01	34.400	0.001	27.40	76.3	1.360	52.60	0.33	0.01	0.93
1200	2.98	0.01	34.475	0.002	27.49	68.2	1.507	69.09	0.46	0.02	0.78
1500	2.53	0.01	34.547	0.002	27.59	59.4	1.701	95.89	0.84	0.02	0.76
2000	1.95	0.01	34.608	0.000	27.68	50.4	1.980	145.67	1.55	0.01	0.72
2500	1.72	0.00	34.642	0.001	27.73	47.0	2.228	203.11	2.10	0.02	0.75
3000	1.62	0.00	34.666	0.000	27.75	45.4	2.464	270.13	2.51	0.03	2.30

CNAV OSHAWA CRUISE OS2 STATION 052 OBSERVED VALUES

DATE 7/06/63 HR 16.0 LAT 43-12 N LONG 128-58 W SNDG 3220 WEA 02 WIND VEL 26 DIR 34
BAROM 22.0 TEMP DRY 13.3 WET 12.8 RELHU 95 WTRCLR SECDI SEA 3 DIR 34 SWELL 3 DIR 35
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 25,38

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	C	13.09	32.690	24.61	6.13	0.547	-0.028	105
1	5	13.07	32.683	24.61	6.29	0.562	-0.042	108
1	9	13.09	32.687	24.61	6.22	0.556	-0.036	107
1	18	13.07	32.689	24.61	6.15	0.549	-0.029	106
1	27	12.91	32.690	24.64	6.18	0.552	-0.030	106
1	45	10.99	32.664	24.98	6.52	0.582	-0.039	107
1	67	10.68	32.669	25.04	6.29	0.562	-0.014	103
1	89	9.92	32.787	25.26	5.68	0.507	0.049	91
1	112	8.62	33.210	25.80	4.76	0.425	0.146	74
1	134	8.51	33.597	26.12	3.76	0.336	0.235	59
1	156	8.36	33.844	26.33	2.93	0.262	0.311	46
2	161	8.30	33.855	26.35	2.82	0.252	0.321	44
2	201	7.70	33.958	26.52	2.49	0.222	0.358	38
2	238	7.12	33.978	26.62	2.44	0.218	0.371	37
2	392	5.59	34.061	26.88	1.31	0.117	0.494	19
2	586	4.70	34.179	27.08	0.55	0.049	0.575	8
2	800	4.00	34.335	27.28	0.29	0.026	0.608	4
2	1257	2.99	34.498	27.51	0.55	0.049	0.601	8
2	1537	2.52	34.548	27.59	0.82	0.073	0.585	11

CNAV OSHAWA CRUISE OS2 STATION 052 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.10	0.18		32.682
10	0.05	0.11		32.680
33	0.09	0.17		32.680
70	0.36	0.13		32.657
100	0.62	0.08		32.740
	10.48	10.27	- WATER COLUMN VALUES	

MESSENGER TIME 0843 INCOMING SOLAR RADIATION - AM 119 PM 108

CNAV OSHAWA CRUISE OS2 STATION 052 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.09	0.00	32.690	0.000	24.61	333.9	0.000	0.00	6.13	0.00	
10	13.09	0.00	32.687	0.000	24.61	334.4	0.034	0.02	6.21	0.00	0.97
20	13.06	0.01	32.690	0.000	24.61	333.9	0.068	0.07	6.15	0.00	0.75
30	12.61	0.08	32.686	0.001	24.70	326.0	0.101	0.15	6.24	0.02	0.93
50	10.84	0.08	32.658	0.002	25.00	297.3	0.164	0.41	6.52	0.01	0.78
75	10.46	0.00	32.689	0.006	25.09	289.2	0.238	0.88	6.11	0.00	0.66
100	9.25	0.07	32.971	0.014	25.51	249.7	0.306	1.49	5.27	0.01	0.65
150	8.40	0.00	33.779	0.007	26.28	178.0	0.413	2.82	3.14	0.00	0.63
200	7.72	0.00	33.959	0.002	26.52	155.6	0.497	4.32	2.49	0.00	0.97
250	6.96	0.01	33.984	0.000	26.65	144.0	0.573	6.06	2.37	0.02	1.14
300	6.37	0.03	34.011	0.000	26.75	135.0	0.643	8.04	2.05	0.08	1.42
400	5.54	0.01	34.065	0.000	26.89	121.6	0.773	12.66	1.27	0.00	0.95
500	5.01	0.04	34.124	0.000	27.00	111.9	0.891	18.09	0.81	0.01	0.66
600	4.65	0.00	34.190	0.001	27.09	103.8	0.999	24.23	0.52	0.00	0.92
700	4.30	0.01	34.264	0.003	27.19	95.2	1.100	30.93	0.36	0.02	0.60
800	4.00	0.00	34.335	0.000	27.28	87.3	1.192	38.02	0.29	0.00	
1000	3.50	0.01	34.427	0.005	27.40	76.3	1.358	53.24	0.32	0.04	0.92
1200	3.09	0.01	34.487	0.002	27.49	68.6	1.505	69.79	0.48	0.02	0.91
1500	2.58	0.00	34.541	0.001	27.58	60.5	1.701	96.91	0.79	0.00	16.36

CNAV OSHAWA CRUISE OS2 STATION 053 OBSERVED VALUES

DATE 7/06/63 HR 19.2 LAT 43-17 N LONG 128-41 W SNDG 2890 WEA 02 WIND VEL 24 DIR 34
BAROM 23.0 TEMP DRY 14.4 WET 13.3 RELHU 89 WTRCLR SECDI SEA 3 DIR 35 SWELL 3 DIR 35
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	12.96	32.699	24.64	6.28	0.561	-0.040	108
1	5	12.92	32.699	24.65	6.29	0.562	-0.040	108
1	9	12.94	32.697	24.64	6.29	0.562	-0.041	108
1	18	12.93	32.701	24.65	6.31	0.564	-0.042	108
1	27	12.93	32.706	24.65	6.33	0.565	-0.044	108
1	45	10.80	32.670	25.02	6.66	0.595	-0.049	109
1	68	10.34	32.644	25.08	6.43	0.574	-0.023	104
1	91	9.85	32.688	25.20	6.07	0.542	0.015	97
1	114	9.10	33.032	25.58	5.95	0.531	0.034	94
1	136	8.31	33.511	26.08	4.11	0.367	0.207	64
1	160	8.12	33.794	26.33	3.20	0.286	0.290	50

CNAV OSHAWA CRUISE OS2 STATION 053 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.09	0.28	2.66				32.700	0.48		0
5	0.09	0.16	2.06			50	32.700	0.44	0.1	1
15	0.09	0.10	0.00			10	32.694	0.51		0
34	0.11	0.18	0.00	0.06	100	1	32.697	0.51		0
				0.07	66					
				0.06	50					
				0.08	33					
				0.04	18					
				0.04	6					
100	0.18	0.00					32.763	0.72	5.5	2
150	0.12						33.290			
200	0.00						33.509	1.85	22.6	28
	3.25	5.00	22.10	- WATER COLUMN VALUES						

MESSENGER TIME 1152 INCOMING SOLAR RADIATION - AM 119 PM 108

LIGHT SATURATION INCUBATOR ILLUMINATION 19100

CNAV OSHAWA CRUISE 052 STATION 053 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.96	0.00	32.699	0.000	24.64	330.8	0.000	0.00	6.28	0.00	
10	12.94	0.00	32.697	0.000	24.64	330.8	0.034	0.02	6.29	0.00	0.97
20	12.96	0.02	32.703	0.000	24.64	331.0	0.067	0.07	6.31	0.00	0.75
30	12.62	0.10	32.702	0.002	24.71	325.0	0.100	0.15	6.39	0.02	0.93
50	10.59	0.07	32.660	0.001	25.05	293.1	0.162	0.41	6.65	0.02	0.79
75	10.21	0.01	32.638	0.008	25.10	288.9	0.236	0.88	6.31	0.01	0.69
100	9.58	0.01	32.795	0.006	25.32	267.7	0.306	1.50	6.12	0.08	0.66
150	8.19	0.05	33.733	0.009	26.27	178.3	0.418	2.89	3.24	0.07	3.78

CNAV OSHAWA CRUISE OS2 STATION 054 OBSERVED VALUES

DATE 8/06/63 HR 00.6 LAT 43-37 N LONG 127-55 W SNDG 3292 WEA 02 WIND VEL 20 DIR 36
BAROM 23.0 TEMP DRY 13.9 WET 12.8 RELHU 88 WTRCLR SECDI SEA 3 DIR 35 SWELL 3 DIR 35
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 15,16

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.07	32.719	24.64	6.19	0.553	-0.033	106
1	5	13.07	32.719	24.64	6.08	0.543	-0.023	104
1	10	13.08	32.716	24.63	5.81	0.519	0.001	100
1	20	13.05	32.718	24.64	6.16	0.550	-0.030	106
1	30	12.99	32.717	24.65	6.22	0.556	-0.035	107
1	49	10.13	32.661	25.13	6.53	0.583	-0.029	105
1	74	9.88	32.634	25.15	6.20	0.554	0.004	99
1	98	7.89	33.004	25.75	5.57	0.497	0.085	85
1	123	7.79	33.340	26.02	4.82	0.430	0.152	74
1	148	7.92	33.735	26.31	3.64	0.325	0.254	56
1	173	7.88	33.849	26.41	3.27	0.292	0.287	50
2	193	7.70	33.889	26.47	3.11	0.278	0.303	48
2	241	7.16	33.942	26.58	2.92	0.261	0.327	44
2	288	6.44	33.927	26.67	3.00	0.268	0.331	45
2	482	4.99	34.119	27.00	0.81	0.072	0.547	12
2	723	4.26	34.273	27.20	0.27	0.024	0.606	4
2	968	3.58	34.399	27.37	0.32	0.029	0.612	4
2	1462	2.64	34.519	27.56	0.76	0.068	0.588	10
2	1759	2.19	34.567	27.63	1.20	0.107	0.556	16

CNAV OSHAWA CRUISE OS2 STATION 054 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.07	0.10		32.716
5	0.06	0.12		34.082
15	0.05	0.14		32.720
34	0.24	0.42		32.607
	3.71	7.14	- WATER COLUMN VALUES	

MESSENGER TIME 1615 INCOMING SOLAR RADIATION - AM 119 PM 108

CNAV OSHAWA CRUISE OS2 STATION 054 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.07	0.00	32.719	0.000	24.64	331.4	0.000	0.00	6.19	0.00	
10	13.08	0.00	32.716	0.000	24.63	332.1	0.034	0.02	5.81	0.00	
20	13.05	0.00	32.718	0.000	24.64	331.6	0.067	0.07	6.16	0.00	
30	12.99	0.00	32.717	0.000	24.65	330.8	0.101	0.15	6.22	0.00	
50	10.10	0.04	32.655	0.002	25.13	285.4	0.163	0.41	6.53	0.00	0.95
75	9.80	0.02	32.646	0.003	25.17	281.7	0.234	0.86	6.18	0.00	0.94
100	7.84	0.02	33.031	0.001	25.77	224.6	0.298	1.43	5.52	0.00	0.89
150	7.92	0.00	33.751	0.002	26.33	173.1	0.398	2.68	3.59	0.01	0.89
200	7.63	0.00	33.901	0.000	26.49	158.7	0.482	4.17	3.07	0.00	0.98
250	7.02	0.01	33.941	0.002	26.60	148.1	0.559	5.95	2.93	0.01	0.79
300	6.30	0.02	33.934	0.004	26.69	139.8	0.632	8.00	2.90	0.05	1.11
400	5.41	0.07	34.017	0.019	26.87	123.6	0.765	12.74	1.89	0.23	1.26
500	4.91	0.01	34.133	0.001	27.02	110.2	0.883	18.16	0.72	0.02	0.91
600	4.55	0.05	34.202	0.002	27.11	101.8	0.990	24.19	0.36	0.08	0.67
700	4.30	0.02	34.261	0.001	27.19	95.4	1.089	30.84	0.26	0.03	0.87
800	4.04	0.00	34.317	0.000	27.26	89.1	1.182	38.02	0.25	0.02	0.68
1000	3.51	0.00	34.410	0.001	27.39	77.6	1.351	53.52	0.34	0.00	0.97
1200	3.09	0.01	34.470	0.005	27.48	69.8	1.501	70.36	0.48	0.00	0.89
1500	2.58	0.00	34.525	0.000	27.57	61.7	1.701	98.00	0.81	0.00	12.04

CNAV OSHAWA CRUISE OS2 STATION 055 OBSERVED VALUES

DATE 8/06/63 HR 04.8 LAT 43-44 N LONG 127-18 W SNDG 2926 WEA 02 WIND VEL 20 DIR 35
BAROM 23.0 TEMP DRY 13.3 WET 12.2 RELHU 88 WTRCLR SECDI SEA 3 DIR 35 SWELL 4 DIR 33
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 11

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.15	32.593	24.52	6.05	0.540	-0.021	104
1	5	13.14	32.591	24.52	6.16	0.550	-0.031	106
1	10	13.16	32.595	24.52	6.15	0.549	-0.030	106
1	19	13.15	32.592	24.52	6.16	0.550	-0.031	106
1	29	13.13	32.613	24.54	6.12	0.547	-0.027	105
1	48	10.56	32.621	25.02	6.59	0.589	-0.040	107
1	72	10.21	32.603	25.07	6.31	0.564	-0.010	102
1	96	8.63	32.949	25.59	5.32	0.475	0.097	83
1	119	8.20	33.191	25.85	4.82	0.430	0.147	75
1	143	8.01	33.591	26.19	3.91	0.349	0.229	60
1	168	7.63	33.787	26.40	3.62	0.323	0.259	56
1	192	7.38	33.855	26.49	3.75	0.335	0.251	57
1	240	6.79	33.942	26.64	2.87	0.256	0.337	43
1	287	6.22	33.960	26.73	2.46	0.220	0.382	37

CNAV OSHAWA CRUISE OS2 STATION 055 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.06	0.04		32.591
5	0.09	0.08		32.592
15	0.05	0.06		32.593
34	0.07	0.10		32.596
	2.24	2.52	- WATER COLUMN VALUES	

MESSENGER TIME 2110 INCOMING SOLAR RADIATION - AM 119 PM 108

CNAV OSHAWA CRUISE OS2 STATION 055 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.15	0.00	32.593	0.000	24.52	342.2	0.000	0.00	6.05	0.00	
10	13.16	0.00	32.595	0.000	24.52	342.5	0.035	0.02	6.15	0.00	
20	13.17	0.01	32.594	0.001	24.52	343.0	0.070	0.07	6.15	0.00	0.88
30	13.01	0.04	32.614	0.000	24.57	338.7	0.104	0.16	6.14	0.01	0.97
50	10.49	0.06	32.613	0.005	25.03	294.9	0.168	0.42	6.60	0.00	0.91
75	10.01	0.04	32.639	0.008	25.13	285.7	0.241	0.89	6.19	0.02	0.84
100	8.51	0.02	32.989	0.005	25.64	237.2	0.307	1.47	5.23	0.02	0.78
150	7.91	0.01	33.664	0.003	26.26	179.3	0.412	2.78	3.77	0.01	0.72
200	7.29	0.00	33.874	0.000	26.51	155.8	0.496	4.28	3.64	0.05	0.92
250	6.66	0.00	33.952	0.000	26.66	142.4	0.571	6.01	2.67	0.03	14.57

CNAV OSHAWA CRUISE OS2 STATION 056 OBSERVED VALUES

DATE 8/06/63 HR 08.3 LAT 43-44 N LONG 126-41 W SNDG 2926 WEA 01 WIND VEL 24 DIR 35
BAROM 22.0 TEMP DRY 12.8 WET 11.7 RELHU 88 WTRCLR SECDI SEA 4 DIR 35 SWELL 4 DIR 33
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 22,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.51	32.489	24.37	6.07	0.542	-0.026	105
1	5	13.50	32.524	24.40	6.04	0.539	-0.024	105
1	9	13.50	32.488	24.37	6.09	0.544	-0.028	105
1	19	13.50	32.489	24.37	6.00	0.536	-0.020	104
1	28	13.46	32.549	24.43	6.09	0.544	-0.028	105
1	46	11.47	32.616	24.86	6.62	0.591	-0.053	110
1	70	9.98	32.899	25.34	5.44	0.486	0.069	88
1	92	8.66	33.490	26.01	3.98	0.355	0.214	62
1	117	8.44	33.712	26.22	3.37	0.301	0.271	53
1	140	8.16	33.876	26.39	2.81	0.251	0.324	44
1	165	7.73	33.955	26.51	2.50	0.223	0.357	38
2	190	7.51	33.977	26.56	2.37	0.212	0.372	36
2	237	7.03	34.000	26.65	2.18	0.195	0.395	33
2	281	6.49	34.018	26.74	1.79	0.160	0.438	27
2	471	5.30	34.137	26.98	0.93	0.083	0.532	14
2	709	4.38	34.298	27.21	0.30	0.027	0.601	4
2	949	3.66	34.391	27.36	0.46	0.041	0.598	6
2	1434	2.59	34.518	27.56	0.74	0.066	0.591	10
2	1726	2.15	34.570	27.64	1.14	0.102	0.562	15

CNAV OSHAWA CRUISE 052 STATION 056 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.51	0.00	32.489	0.000	24.37	356.7	0.000	0.00	6.07	0.00	
10	13.50	0.00	32.484	0.001	24.37	357.1	0.036	0.02	6.08	0.01	1.00
20	13.51	0.01	32.495	0.001	24.37	356.8	0.072	0.07	6.00	0.00	0.85
30	13.28	0.05	32.555	0.003	24.47	348.2	0.108	0.17	6.17	0.03	0.95
50	11.17	0.03	32.642	0.004	24.93	304.2	0.174	0.43	6.51	0.04	0.84
75	9.63	0.03	33.036	0.020	25.50	250.3	0.243	0.87	5.09	0.04	0.73
100	8.52	0.05	33.590	0.016	26.11	192.9	0.299	1.36	3.72	0.04	0.71
150	7.98	0.01	33.917	0.002	26.45	161.6	0.389	2.49	2.66	0.01	0.67
200	7.42	0.00	33.983	0.001	26.58	149.5	0.467	3.89	2.34	0.01	0.89
250	6.87	0.01	34.005	0.000	26.67	141.2	0.540	5.58	2.07	0.01	0.69
300	6.32	0.02	34.028	0.001	26.77	133.0	0.609	7.53	1.67	0.02	1.19
400	5.61	0.06	34.088	0.002	26.90	120.8	0.737	12.10	1.15	0.04	1.24
500	5.17	0.01	34.158	0.001	27.01	111.3	0.855	17.50	0.82	0.01	0.87
600	4.75	0.02	34.228	0.003	27.11	102.2	0.962	23.57	0.51	0.01	0.67
700	4.41	0.00	34.292	0.000	27.20	94.3	1.062	30.19	0.31	0.00	0.94
800	4.09	0.00	34.339	0.002	27.27	88.0	1.154	37.28	0.31	0.03	0.64
1000	3.53	0.00	34.407	0.000	27.38	78.1	1.322	52.75	0.48	0.01	0.95
1200	3.05	0.00	34.465	0.001	27.48	69.7	1.472	69.62	0.58	0.02	0.89
1500	2.48	0.00	34.531	0.000	27.58	60.1	1.669	96.85	0.81	0.00	10.78

CNAV OSHAWA CRUISE OS2 STATION 057 OBSERVED VALUES

DATE 8/06/63 HR 13.0 LAT 43-44 N LONG 126-04 W SNDG 2968 WEA 02 WIND VEL 16 DIR 34
BAROM 22.0 TEMP DRY 12.2 WET 11.7 RELHU 94 WTRCLR SECDI SEA 2 DIR 34 SWELL 3 DIR 35
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	ACU	SATN
1	0	14.00	31.108	23.21	5.89	0.526	-0.011	102
1	5	13.96	31.107	23.21	5.92	0.529	-0.013	102
1	10	13.96	31.476	23.50	5.96	0.532	-0.018	103
1	20	13.16	32.553	24.49	6.13	0.547	-0.028	105
1	30	12.63	32.633	24.65	6.32	0.564	-0.040	108
1	50	11.57	32.632	24.85	6.29	0.562	-0.025	105
1	75	9.98	32.940	25.37	5.39	0.481	0.074	87
1	100	8.80	33.402	25.92	4.27	0.381	0.187	67
1	125	8.37	33.654	26.18	3.51	0.313	0.259	55
1	149	8.10	33.780	26.32	3.11	0.278	0.298	48
1	175	7.80	33.855	26.43	2.89	0.258	0.322	45
1	199	7.60	33.913	26.50	2.65	0.237	0.346	41
1	249	7.19	33.962	26.60	2.20	0.196	0.391	33
1	299	6.78	33.996	26.68	1.93	0.172	0.421	29

CNAV OSHAWA CRUISE OS2 STATION 057 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	
		LAB-I	DECK-I
0	0.12	0.53	6.08
5	0.10	0.24	
15	0.09	0.15	
34	0.11	0.22	
100	0.12	0.04	
	3.39	7.39	- WATER COLUMN VALUES

MESSENGER TIME 0442 INCOMING SOLAR RADIATION - AM 137 PM 141

CNAV OSHAWA CRUISE OS2 STATION 057 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.00	0.00	31.108	0.000	23.21	467.6	0.000	0.00	5.89	0.00	
10	13.96	0.00	31.476	0.000	23.50	440.0	0.046	0.02	5.96	0.00	
20	13.16	0.00	32.553	0.000	24.49	345.8	0.086	0.08	6.13	0.00	
30	12.63	0.00	32.633	0.000	24.65	330.3	0.120	0.17	6.32	0.00	
50	11.57	0.00	32.632	0.000	24.85	311.8	0.185	0.43	6.29	0.00	
75	9.98	0.00	32.940	0.000	25.37	262.9	0.257	0.89	5.39	0.00	
100	8.80	0.00	33.402	0.000	25.92	210.9	0.317	1.42	4.27	0.00	
150	8.09	0.00	33.784	0.000	26.33	173.0	0.413	2.63	3.10	0.00	0.95
200	7.59	0.00	33.915	0.000	26.50	157.1	0.497	4.12	2.64	0.00	0.99
250	7.18	0.00	33.962	0.000	26.60	148.6	0.574	5.90	2.19	0.00	14.18

CNAV OSHAWA CRUISE OS2 STATION 058 OBSERVED VALUES

DATE 8/06/63 HR 16.2 LAT 43-44 N LONG 125-25 W SNDG 3018 WEA 02 WIND VEL 14 DIR 02
BAROM 22.0 TEMP DRY 13.9 WET 12.2 RELHU 82 WTRCLR SECDI SEA 2 DIR 02 SWELL 2 DIR 36
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.97	29.020	21.61	6.00	0.536	-0.013	102
1	5	13.93	29.023	21.62	6.00	0.536	-0.012	102
1	10	14.05	29.827	22.21	6.03	0.539	-0.019	104
1	20	12.95	32.595	24.56	6.35	0.567	-0.046	109
1	30	12.44	32.657	24.71	6.38	0.570	-0.043	108
1	49	11.05	32.675	24.98	6.16	0.550	-0.007	101
1	73	9.65	32.835	25.34	5.12	0.457	0.102	82
1	97	9.12	33.207	25.72	4.23	0.378	0.187	67
1	121	8.45	33.562	26.10	3.46	0.309	0.263	54
1	146	8.27	33.738	26.26	2.81	0.251	0.323	44
1	170	7.91	33.857	26.41	2.50	0.223	0.355	39

CNAV OSHAWA CRUISE OS2 STATION 058 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.25	0.63		29.024
5	0.25	0.65		29.039
15	0.31	0.49		32.486
34	0.24	0.47		32.657
100	0.06	0.02		33.237
	9.19	18.14	- WATER COLUMN VALUES	

MESSENGER TIME 0837 INCOMING SOLAR RADIATION - AM 137 PM 141

CNAV OSHAWA CRUISE OS2 STATION 058 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.97	0.00	29.020	0.000	21.61	620.6	0.000	0.00	6.00	0.00	
10	14.05	0.00	29.827	0.000	22.21	562.9	0.060	0.03	6.03	0.00	
20	12.95	0.00	32.595	0.000	24.56	338.8	0.106	0.09	6.35	0.00	
30	12.44	0.00	32.657	0.000	24.71	325.0	0.139	0.18	6.38	0.00	
50	10.98	0.00	32.678	0.000	24.99	298.2	0.202	0.43	6.12	0.01	0.95
75	9.59	0.01	32.862	0.003	25.37	262.5	0.272	0.88	5.04	0.00	0.89
100	9.03	0.01	33.257	0.003	25.77	225.1	0.334	1.43	4.13	0.00	0.84
150	8.24	0.01	33.758	0.001	26.28	177.2	0.435	2.70	2.73	0.00	5.52

CNAV OSHAWA CRUISE OS2 STATION 059 OBSERVED VALUES

DATE 8/06/63 HR 19.1 LAT 43-44 N LONG 124-56 W SNDG 1244 WEA 02 WIND VEL 10 DIR 01
BAROM 22.0 TEMP DRY 14.4 WET 12.8 RELHU 83 WTRCLR SECDI 16 SEA 2 DIR 01 SWELL 3 DIR 34
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.85	30.838	23.23	6.29	0.562	-0.033	106
1	4	12.82	30.827	23.22	6.65	0.594	-0.065	112
1	8	12.72	30.868	23.27	6.61	0.590	-0.060	111
1	16	10.97	31.856	24.36	6.34	0.566	-0.019	104
1	24	10.44	32.328	24.82	6.33	0.565	-0.014	102
1	40	9.98	32.446	24.99	6.46	0.577	-0.020	104
1	61	9.56	32.622	25.19	5.80	0.518	0.043	92
1	82	8.94	33.147	25.70	4.51	0.403	0.165	71
1	102	8.58	33.511	26.04	3.46	0.309	0.262	54
1	122	8.26	33.767	26.29	2.99	0.267	0.307	47
1	142	7.99	33.843	26.39	2.64	0.236	0.341	41
1	164	7.61	33.918	26.50	2.39	0.213	0.369	37
1	204	7.00	33.978	26.64	2.18	0.195	0.396	33
1	245	6.56	34.017	26.73	1.92	0.171	0.425	29

CNAV OSHAWA CRUISE OS2 STATION 059 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.25	0.21	1.38				30.722	0.43	0.4	6
6	0.21	0.31	1.12	0.25	100	50	30.799	0.45	0.6	7
				0.19	66					
				0.18	50					
				0.11	33					
				0.02	18					
				0.00	6					
14	0.26	0.33	0.00			10	31.559	0.51	0.6	5
38	1.23	0.52	0.42			1	32.405	0.66	0.6	4
	17.01	14.33	11.98	- WATER COLUMN VALUES						

MESSENGER TIME 1148 INCOMING SOLAR RADIATION - AM 137 PM 141

LIGHT SATURATION INCUBATOR ILLUMINATION 18000

CNAV OSHAWA CRUISE OS2 STATION 059 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.85	0.00	30.838	0.000	23.23	465.8	0.000	0.00	6.29	0.00	
10	12.32	0.10	31.083	0.054	23.51	438.4	0.046	0.02	6.54	0.02	0.89
20	10.62	0.04	32.141	0.010	24.64	331.2	0.085	0.08	6.32	0.01	0.59
30	10.21	0.03	32.436	0.044	24.94	303.1	0.117	0.16	6.40	0.03	0.83
50	9.78	0.02	32.507	0.014	25.07	291.4	0.177	0.41	6.24	0.01	0.68
75	9.14	0.02	32.961	0.018	25.52	248.4	0.245	0.84	4.96	0.03	0.69
100	8.61	0.00	33.480	0.000	26.01	202.3	0.301	1.34	3.55	0.01	0.87
150	7.86	0.00	33.873	0.001	26.43	163.1	0.393	2.49	2.54	0.00	0.66
200	7.05	0.00	33.975	0.001	26.63	145.2	0.471	3.88	2.19	0.01	0.87

CNAV OSHAWA CRUISE OS2 STATION 060 OBSERVED VALUES

THREE MILE LAKE

DATE 8/06/63 HR 22.1 LAT 43-44 N LONG 124-19 W SNDG 101 WEA 02 WIND VEL 2 DIR 99
BAROM 22.0 TEMP DRY 15.0 WET 13.9 RELHU 89 WTRCLR SECDI SEA 0 DIR 00 SWELL 1 DIR 32
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.93	32.492	24.49	7.43	0.664	-0.142	127
1	5	12.68	32.514	24.55	7.49	0.669	-0.144	127
1	10	12.16	32.584	24.71	7.50	0.670	-0.140	126
1	20	8.98	33.282	25.80	3.58	0.320	0.247	56
1	30	8.57	33.513	26.04	3.35	0.299	0.272	52
1	50	8.27	33.675	26.22	2.68	0.239	0.335	42
1	75	7.60	33.884	26.48	1.90	0.170	0.413	29

CNAV OSHAWA CRUISE OS2 STATION 060 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.43	4.19		32.496
3	1.14	2.20		32.501
10	1.72	5.96		32.583
19	1.21	0.77		33.251
90	0.14	0.03		34.018
	6.45	68.12	- WATER COLUMN VALUES	

MESSENGER TIME 14.8 INCOMING SOLAR RADIATION - AM 137 PM 141

CNAV OSHAWA CRUISE OS2 STATION 060 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.93	0.00	32.492	0.000	24.49	345.5	0.000	0.00	7.43	0.00	
10	12.16	0.00	32.584	0.000	24.71	324.9	0.034	0.02	7.50	0.00	
20	8.98	0.00	33.282	0.000	25.80	221.1	0.062	0.06	3.58	0.00	
30	8.57	0.00	33.513	0.000	26.04	198.1	0.083	0.11	3.35	0.00	
50	8.27	0.00	33.675	0.000	26.22	182.0	0.121	0.27	2.68	0.00	
75	7.60	0.00	33.884	0.000	26.48	157.5	0.164	0.54	1.90	0.00	

CNAV OSHAWA CRUISE OS2 STATION 061 OBSERVED VALUES

DATE 9/06/63 HR 00.9 LAT 44-01 N LONG 124-50 W SNDG 104 WEA 41 WIND VEL 10 DIR 33
BAROM 22.0 TEMP DRY 13.9 WET 13.9 RELHU 99 WTRCLR SECDI SEA 1 DIR 33 SWELL 2 DIR 33
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	13.73	30.240	22.59	6.19	0.553	-0.032	106
1	5	13.05	30.545	22.96	6.38	0.570	-0.042	108
1	10	12.86	30.728	23.14	6.46	0.577	-0.048	109
1	20	10.80	32.161	24.62	6.64	0.593	-0.045	108
1	30	10.49	32.319	24.80	6.64	0.593	-0.042	108
1	50	9.61	32.502	25.09	5.78	0.516	0.045	92
1	75	8.91	33.135	25.69	4.16	0.372	0.196	65

CNAV OSHAWA CRUISE OS2 STATION 061 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.73	0.00	30.240	0.000	22.59	526.2	0.000	0.00	6.19	0.00	
10	12.86	0.00	30.728	0.000	23.14	474.3	0.051	0.03	6.46	0.00	
20	10.80	0.00	32.161	0.000	24.62	332.8	0.092	0.08	6.64	0.00	
30	10.49	0.00	32.319	0.000	24.80	316.2	0.124	0.17	6.64	0.00	
50	9.61	0.00	32.502	0.000	25.09	289.1	0.185	0.42	5.78	0.00	
75	8.91	0.00	33.135	0.000	25.69	231.9	0.251	0.83	4.16	0.00	

CNAV OSHAWA CRUISE OS2 STATION 062 OBSERVED VALUES

DATE 9/06/63 HR 04.3 LAT 44-31 N LONG 125-17 W SNDG 2926 WEA 02 WIND VEL 16 DIR 33
BAROM 20.0 TEMP DRY 13.3 WET 12.8 RELHU 95 WTRCLR SECDI SEA 3 DIR 33 SWELL 3 DIR 32
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 21

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	14.27	29.785	22.14	5.94	0.531	-0.013	103
1	5	14.24	29.775	22.13	5.97	0.533	-0.016	103
1	9	14.24	29.852	22.19	5.94	0.531	-0.013	103
1	18	13.50	32.014	24.01	6.25	0.558	-0.041	108
1	27	12.74	32.656	24.65	6.36	0.568	-0.044	108
1	46	11.11	32.642	24.94	6.40	0.572	-0.029	105
1	68	10.09	32.748	25.20	5.75	0.514	0.041	93
1	91	9.12	33.377	25.85	4.24	0.379	0.185	67
1	114	8.70	33.646	26.13	3.40	0.304	0.265	53
1	126	8.43	33.797	26.29	2.92	0.261	0.311	46
1	160	8.17	33.904	26.41	2.65	0.237	0.338	41
1	183	7.82	33.951	26.50	2.42	0.216	0.363	37
1	229	7.24	34.003	26.62	2.07	0.185	0.402	32
1	274	6.77	34.050	26.71	1.92	0.171	0.422	29

CNAV OSHAWA CRUISE OS2 STATION 062 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.14	0.32		29.827
6	0.09	0.13		29.844
19	0.17	0.38		31.049
38	0.23	0.20		32.657
100	0.07	0.01		33.359
	6.21	10.15	- WATER COLUMN VALUES	

MESSENGER TIME 1952 INCOMING SOLAR RADIATION - AM 137 PM 141

CNAV OSHAWA CRUISE 052 STATION 062 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.27	0.00	29.785	0.000	22.14	570.1	0.000	0.00	5.94	0.00	
10	14.18	0.02	30.062	0.070	22.37	548.2	0.057	0.03	5.97	0.01	0.97
20	13.33	0.00	32.240	0.032	24.21	372.0	0.103	0.10	6.29	0.00	0.75
30	12.46	0.02	32.712	0.043	24.75	321.3	0.138	0.18	6.39	0.01	0.94
50	10.89	0.02	32.638	0.009	24.98	299.6	0.201	0.44	6.34	0.00	0.80
75	9.76	0.02	32.930	0.031	25.40	260.1	0.271	0.88	5.30	0.05	0.70
100	8.93	0.03	33.502	0.015	25.98	205.5	0.330	1.40	3.88	0.03	0.76
150	8.22	0.04	33.899	0.015	26.40	166.4	0.423	2.58	2.65	0.06	0.95
200	7.59	0.00	33.975	0.001	26.55	152.6	0.504	4.02	2.27	0.00	0.84
250	7.01	0.00	34.016	0.001	26.66	142.3	0.578	5.73	1.97	0.00	11.95

CNAV OSHAWA CRUISE OS2 STATION 063 OBSERVED VALUES

DATE 9/06/63 HR 07.2 LAT 44-40 N LONG 125-54 W SNDG 2834 WEA 02 WIND VEL 18 DIR 34
BAROM 19.0 TEMP DRY 13.3 WET 12.2 RELHU 88 WTRCLR SECDI SEA 2 DIR 34 SWELL 3 DIR 32
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	14.22	31.209	23.24	5.94	0.531	-0.018	103
1	5	14.24	31.212	23.24	5.97	0.533	-0.021	104
1	9	14.26	31.212	23.23	5.94	0.531	-0.018	104
1	18	13.79	32.231	24.11	6.25	0.558	-0.044	109
1	27	12.48	32.578	24.64	6.36	0.568	-0.041	108
1	46	10.60	32.542	24.95	6.40	0.572	-0.023	104
1	70	10.59	32.662	25.05	5.75	0.514	0.035	94
1	94	9.32	32.995	25.52	4.24	0.379	0.184	67
1	118	8.11	33.361	25.99	3.40	0.304	0.274	53
1	141	7.99	33.718	26.29	2.92	0.261	0.317	45
1	165	7.68	33.866	26.45	2.65	0.237	0.345	41
1	189	7.55	33.939	26.53	2.42	0.216	0.367	37
1	237	7.55	33.978	26.56	2.07	0.185	0.398	32
1	285	6.02	33.949	26.74	1.92	0.171	0.433	28

CNAV OSHAWA CRUISE OS2 STATION 063 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.07	0.12		31.235
6	0.13	0.03		31.241
19	0.12	0.04		31.242
38	0.11	0.06		32.069
100	0.23	0.03		32.737
	4.36	1.87	- WATER COLUMN VALUES	

MESSENGER TIME 2251 INCOMING SOLAR RADIATION - AM 137 PM 141

CNAV OSHAWA CRUISE OS2 STATION 063 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.22	0.00	31.209	0.000	23.24	464.4	0.000	0.00	5.94	0.00	
10	14.25	0.00	31.307	0.034	23.31	458.0	0.047	0.02	5.97	0.01	0.97
20	13.52	0.03	32.347	0.013	24.26	367.8	0.089	0.09	6.29	0.00	0.75
30	12.09	0.01	32.603	0.026	24.73	322.6	0.123	0.17	6.39	0.01	0.95
50	10.55	0.09	32.548	0.001	24.97	300.7	0.186	0.43	6.35	0.00	0.83
75	10.37	0.04	32.721	0.005	25.13	285.5	0.260	0.90	5.44	0.04	0.76
100	8.96	0.03	33.085	0.001	25.65	236.9	0.326	1.48	3.98	0.01	0.73
150	7.87	0.01	33.791	0.006	26.36	169.4	0.428	2.76	2.80	0.01	0.67
200	7.60	0.06	33.957	0.002	26.53	154.1	0.510	4.21	2.32	0.00	0.90
250	7.38	0.03	33.973	0.001	26.58	150.6	0.586	5.98	2.01	0.00	14.64

CNAV OSHAWA CRUISE OS2 STATION 064 OBSERVED VALUES

DATE 9/06/63 HR 11.9 LAT 45-07 N LONG 124-52 W SNDG 714 WEA 02 WIND VEL 16 DIR 34
BAROM 14.0 TEMP DRY 13.3 WET 12.8 RELHU 95 WTRCLR SECDI SEA 0 DIR 00 SWELL 1 DIR 33
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.69	27.990	20.87	6.16	0.550	-0.021	104
1	5	13.69	28.085	20.94	6.24	0.557	-0.028	105
1	10	13.37	31.435	23.59	6.05	0.540	-0.019	104
1	20	11.18	32.420	24.76	6.55	0.585	-0.043	108
1	30	10.41	32.442	24.91	6.85	0.612	-0.060	111
1	49	9.84	32.507	25.06	6.09	0.544	0.014	97
1	74	9.37	32.944	25.47	4.94	0.441	0.121	78
1	99	8.95	33.413	25.91	3.94	0.352	0.214	62
1	124	8.62	33.647	26.14	3.32	0.297	0.273	52
1	149	8.29	33.782	26.30	2.92	0.261	0.313	45
1	174	7.93	33.889	26.43	2.60	0.232	0.346	40
1	199	7.53	33.929	26.52	2.50	0.223	0.360	38
1	248	6.97	33.977	26.64	2.16	0.193	0.398	33
1	298	6.37	34.013	26.75	1.84	0.164	0.435	27

CNAV OSHAWA CRUISE OS2 STATION 064 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.35	0.77	2.54	27.682
6	0.31	0.49		29.806
19	0.28	0.30		32.382
38	1.27	0.60		32.462
100	0.38	0.56		32.917
	20.58	17.46	- WATER COLUMN VALUES	

MESSENGER TIME 0410 INCOMING SOLAR RADIATION - AM 187 PM 194

CNAV OSHAWA CRUISE OS2 STATION 064 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.69	0.00	27.990	0.000	20.87	691.2	0.000	0.00	6.16	0.00	
10	13.37	0.00	31.435	0.000	23.59	431.7	0.057	0.02	6.05	0.00	
20	11.18	0.00	32.420	0.000	24.76	320.1	0.095	0.08	6.55	0.00	
30	10.41	0.00	32.442	0.000	24.91	305.8	0.126	0.16	6.85	0.00	
50	9.82	0.00	32.520	0.002	25.07	290.9	0.187	0.40	6.04	0.00	0.95
75	9.35	0.00	32.965	0.002	25.49	251.2	0.255	0.84	4.89	0.00	0.94
100	8.94	0.00	33.426	0.001	25.92	211.2	0.313	1.35	3.91	0.00	0.94
150	8.28	0.00	33.787	0.000	26.30	175.5	0.411	2.58	2.90	0.00	0.94
200	7.52	0.00	33.930	0.000	26.53	154.9	0.494	4.06	2.49	0.00	0.99
250	6.95	0.00	33.978	0.000	26.64	144.3	0.569	5.80	2.14	0.00	13.22

CNAV OSHAWA CRUISE OS2 STATION 065 OBSERVED VALUES

NETARTS BAY

DATE 9/06/63 HR 15.2 LAT 45-25 N LONG 124-11 W SNDG 133 WEA 02 WIND VEL 16 DIR 32
BAROM 17.0 TEMP DRY 13.9 WET 12.8 RELHU 88 WTRCLR SECDI 8 SEA 3 DIR 32 SWELL 2 DIR 33
CLOUD TYPE AMT 6 VIS 7 WIRE ANGLE(S) 4

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.17	25.460	19.02	6.81	0.608	-0.064	112
1	5	12.70	30.949	23.34	6.51	0.581	-0.051	110
1	10	11.84	31.752	24.12	6.59	0.589	-0.052	110
1	20	10.13	32.212	24.78	6.54	0.584	-0.028	105
1	30	9.81	32.328	24.92	5.99	0.535	0.024	96
1	45	9.10	32.699	25.32	5.19	0.464	0.104	82
1	70	8.27	33.479	26.06	3.02	0.270	0.305	47
1	95	7.17	33.931	26.58	2.16	0.193	0.395	33
1	120	6.74	33.971	26.67	1.99	0.178	0.416	30

CNAV OSHAWA CRUISE OS2 STATION 065 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	2.36	6.51		24.914
3	2.23	4.22		30.566
11	1.15	1.61		31.855
22	1.34	1.27		32.225
	34.12	55.26	- WATER COLUMN VALUES	

MESSENGER TIME 0722 INCOMING SOLAR RADIATION - AM 187 PM 194

CNAV OSHAWA CRUISE OS2 STATION 065 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.17	0.00	25.460	0.000	19.02	668.7	0.000	0.00	6.81	0.00	
10	11.84	0.00	31.752	0.000	24.12	380.5	0.063	0.02	6.59	0.00	
20	10.13	0.00	32.212	0.000	24.78	318.2	0.099	0.07	6.54	0.00	
30	9.81	0.00	32.328	0.000	24.92	304.7	0.130	0.15	5.99	0.00	
50	8.93	0.02	32.860	0.014	25.48	252.1	0.186	0.38	4.75	0.06	0.86
75	8.03	0.03	33.599	0.002	26.19	184.7	0.241	0.72	2.77	0.02	0.77
100	7.00	0.01	33.959	0.009	26.62	144.2	0.283	1.09	2.09	0.01	5.34

CNAV OSHAWA CRUISE OS2 STATION 066 OBSERVED VALUES

DATE 9/06/63 HR 16.7 LAT 45-25 N LONG 124-29 W SNDG 384 WEA 02 WIND VEL 20 DIR 32
BAROM 17.0 TEMP DRY 13.3 WET 12.8 RELHU 95 WTRCLR SECDI SEA 2 DIR 31 SWELL 2 DIR 31
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 30

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.85	30.728	23.14	6.31	0.564	-0.034	106
1	4	12.82	30.721	23.14	6.42	0.573	-0.044	108
1	9	12.79	30.792	23.20	6.45	0.576	-0.046	109
1	17	11.80	32.179	24.46	6.57	0.587	-0.051	109
1	26	10.88	32.357	24.76	6.55	0.585	-0.039	107
1	43	9.95	32.444	24.99	6.29	0.562	-0.005	101
1	65	9.19	32.801	25.39	5.11	0.456	0.109	81
1	88	8.43	33.404	25.98	3.75	0.335	0.238	58
1	110	8.09	33.677	26.24	2.95	0.263	0.313	46
1	132	7.79	33.848	26.42	2.80	0.250	0.330	43
1	154	7.57	33.908	26.50	2.65	0.237	0.346	41
1	176	7.25	33.943	26.57	2.45	0.219	0.368	37

CNAV OSHAWA CRUISE OS2 STATION 066 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.65	2.12		30.647
6	0.63	1.77		30.652
19	0.95	1.38		32.013
	32.16	45.24	- WATER COLUMN VALUES	

MESSENGER TIME 0854 INCOMING SOLAR RADIATION - AM 187 PM 194

CNAV OSHAWA CRUISE OS2 STATION 066 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.85	0.00	30.728	0.000	23.14	473.9	0.000	0.00	6.31	0.00	
10	12.69	0.02	30.954	0.050	23.35	454.6	0.047	0.02	6.47	0.00	0.90
20	11.47	0.00	32.325	0.051	24.63	332.0	0.087	0.08	5.58	0.00	0.68
30	10.60	0.02	32.385	0.015	24.83	313.2	0.119	0.16	6.53	0.01	0.88
50	9.68	0.02	32.531	0.002	25.10	288.0	0.180	0.41	5.97	0.03	0.73
75	8.83	0.02	33.069	0.023	25.65	235.7	0.246	0.83	4.49	0.03	0.66
100	8.22	0.01	33.578	0.008	26.15	189.3	0.299	1.30	3.24	0.01	0.64
150	7.61	0.00	33.902	0.002	26.49	157.5	0.387	2.40	2.68	0.00	0.78

CNAV OSHAWA CRUISE OS2 STATION 067 OBSERVED VALUES

DATE 9/06/63 HR 19.5 LAT 45-24 N LONG 124-54 W SNDG 1100 WEA 01 WIND VEL 24 DIR 33
BAROM 17.0 TEMP DRY 13.3 WET 13.3 RELHU 99 WTRCLR SECDI SEA 3 DIR 33 SWELL 3 DIR 31
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 40

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.66	31.169	23.32	6.08	0.543	-0.024	105
1	3	13.59	31.170	23.34	6.18	0.552	-0.032	106
1	5	13.61	31.167	23.33	6.15	0.549	-0.030	106
1	10	13.11	31.367	23.58	5.68	0.507	0.017	97
1	15	11.71	32.138	24.44	6.53	0.583	-0.046	109
1	25	10.68	32.475	24.89	6.54	0.584	-0.036	107
1	40	10.31	32.567	25.02	5.99	0.535	0.017	97
1	57	9.44	32.957	25.47	5.01	0.447	0.114	80
1	73	9.17	33.361	25.83	4.18	0.373	0.190	66
1	86	8.97	33.541	26.00	3.63	0.324	0.241	57
1	101	8.69	33.648	26.13	3.05	0.272	0.296	48
1	119	8.53	33.736	26.22	2.78	0.248	0.322	44
1	145	8.26	33.842	26.35	2.55	0.228	0.346	40
1	175	7.97	33.904	26.44	2.31	0.206	0.371	36

CNAV OSHAWA CRUISE OS2 STATION 067 BIOLOGICAL DATA

DATE 9/06/63 LAT 45-24 N LONG 124-54 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT SAT PROD	LIGHT SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.55	1.49	6.58	1.05	100		31.188	0.42	0.1	3
				0.93	66					
				0.76	50					
				0.64	33					
				0.41	18					
				0.07	6					
4	0.40	2.40	10.58			50	31.190			

MESSENGER TIME 1148 INCOMING SOLAR RADIATION - AM 187 PM 194

LIGHT SATURATION INCUBATOR ILLUMINATION 18700

CNAV OSHAWA CRUISE OS2 STATION 067 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.66	0.00	31.169	0.000	23.32	456.5	0.000	0.00	6.08	0.00	
10	13.11	0.00	31.367	0.000	23.58	431.8	0.045	0.02	5.68	0.00	
20	11.01	0.07	32.421	0.058	24.79	317.1	0.083	0.08	6.69	0.08	0.77
30	10.50	0.07	32.520	0.027	24.96	301.5	0.114	0.16	6.41	0.01	0.76
50	9.79	0.04	32.776	0.011	25.27	271.6	0.172	0.39	5.43	0.02	0.67
75	9.14	0.00	33.396	0.001	25.86	216.1	0.233	0.78	4.09	0.00	0.79
100	8.71	0.00	33.643	0.001	26.12	191.7	0.285	1.23	3.08	0.00	0.90
150	8.21	0.00	33.858	0.000	26.37	169.3	0.376	2.39	2.51	0.00	9.75

CNAV OSHAWA CRUISE OS2 STATION 068 OBSERVED VALUES

DATE 9/06/63 HR 22.9 LAT 45-24 N LONG 125-35 W SNDG 1615 WEA 02 WIND VEL 24 DIR 32
BAROM 18.0 TEMP DRY . WET . RELHU WTRCLR SECDI SEA 4 DIR 31 SWELL 4 DIR 32
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) --

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	14.06	30.856	23.00	5.92	0.529	-0.013	103
1	5	14.03	30.858	23.01	5.99	0.535	-0.019	104
1	10	14.04	30.864	23.01	5.99	0.535	-0.019	104
1	20	13.94	31.015	23.15	5.96	0.532	-0.016	103
1	30	11.69	32.364	24.62	6.53	0.583	-0.047	109
1	50	10.53	32.547	24.97	6.19	0.553	-0.003	101
1	74	9.70	32.873	25.36	5.19	0.464	0.095	83
1	99	9.06	33.391	25.87	4.18	0.373	0.192	66
1	123	8.76	33.668	26.13	3.28	0.293	0.275	52
1	148	8.40	33.814	26.30	2.79	0.249	0.323	44
1	174	7.93	33.891	26.43	2.55	0.228	0.350	39
1	199	7.57	33.937	26.52	2.37	0.212	0.371	36

CNAV OSHAWA CRUISE OS2 STATION 068 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.21	0.43		30.870
4	0.25	0.40		30.874
18	0.23	0.50		30.925
	13.72	18.21	- WATER COLUMN VALUES	

MESSENGER TIME 1515 INCOMING SOLAR RADIATION - AM 187 PM 194

CNAV OSHAWA CRUISE OS2 STATION 069 OBSERVED VALUES

DATE 10/06/63 HR 01.6 LAT 45-24 N LONG 126-10 W SNDG 2634 WEA 02 WIND VEL 24 DIR 35
BAROM 18.0 TEMP DRY WET RELHU WTRCLR SECDI SEA 4 DIR 35 SWELL 4 DIR 35
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	14.07	31.040	23.14	5.92	0.529	-0.014	103
1	5	14.05	31.045	23.15	5.95	0.531	-0.016	103
1	10	14.05	31.095	23.19	5.99	0.535	-0.020	104
1	20	13.39	31.992	24.01	6.14	0.548	-0.030	106
1	29	12.06	32.576	24.71	6.48	0.579	-0.047	109
1	49	10.2[illegible]	32.558	25.03	6.51	0.581	-0.028	105
1	74	9.66	32.948	25.43	5.15	0.460	0.099	82
1	99	8.94	33.493	25.97	3.89	0.347	0.219	61
1	123	8.60	33.702	26.19	3.09	0.276	0.294	48
1	147	8.35	33.814	26.31	2.87	0.256	0.316	45
1	173	7.88	33.885	26.44	2.70	0.241	0.337	42
1	197	7.51	33.933	26.53	2.50	0.223	0.360	38

CNAV OSHAWA CRUISE 052 STATION 069

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	INTERPOLATED AND COMPUTED VALUES SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.07	0.00	31.040	0.000	23.14	473.9	0.000	0.00	5.92	0.00	
10	14.05	0.00	31.095	0.000	23.19	469.7	0.048	0.02	5.99	0.00	
20	13.39	0.00	31.992	0.000	24.01	391.4	0.091	0.09	6.14	0.00	
30	11.95	0.00	32.593	0.017	24.75	321.0	0.127	0.18	6.51	0.00	0.99
50	10.18	0.01	32.568	0.002	25.05	293.2	0.189	0.43	6.47	0.01	0.95
75	9.63	0.00	32.972	0.003	25.45	255.0	0.258	0.87	5.09	0.00	0.94
100	8.92	0.00	33.506	0.001	25.98	205.1	0.316	1.38	3.85	0.00	0.94
150	8.30	0.00	33.824	0.001	26.33	173.1	0.411	2.58	2.85	0.00	0.86

CNAV OSHAWA CRUISE OS2 STATION 070 OBSERVED VALUES

DATE 10/06/63 HR 04.0 LAT 45-24 N LONG 126-45 W SNDG 2816 WEA 02 WIND VEL 24 DIR 32
BAROM 19.0 TEMP DRY 12.2 WET 11.1 RELHU 88 WTRCLR SECCHI SEA 4 DIR 32 SWELL 4 DIR 32
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 18.30

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	UGA/L	AOU	SATN
1	0	13.62	31.762	23.79	6.04	0.539	-0.022	104
1	5	13.62	31.763	23.79	5.99	0.535	-0.018	103
1	10	13.63	31.764	23.79	6.08	0.543	-0.026	105
1	20	13.03	32.159	24.21	5.96	0.532	-0.010	102
1	29	11.63	32.535	24.77	6.61	0.590	-0.054	110
1	49	10.34	32.585	25.03	6.34	0.566	-0.014	103
1	73	9.61	32.635	25.19	5.80	0.518	0.043	92
1	97	8.39	33.256	25.87	4.24	0.379	0.196	66
1	121	8.48	33.653	26.17	3.36	0.300	0.271	53
1	145	8.12	33.841	26.37	2.82	0.252	0.324	44
1	170	7.82	33.897	26.46	2.58	0.230	0.349	40
2	173	7.89	33.881	26.43	2.61	0.233	0.345	40
2	216	7.46	33.957	26.55	2.36	0.211	0.373	36
2	260	6.87	33.981	26.66	2.16	0.193	0.399	33
2	435	5.13	34.060	26.94	1.06	0.095	0.523	15
2	661	4.41	34.241	27.16	0.32	0.029	0.599	5
2	893	3.78	34.364	27.32	0.30	0.027	0.611	4
2	1357	2.77	34.506	27.53	0.46	0.041	0.613	6
2	1827	2.09	34.588	27.66	1.19	0.106	0.559	16
2	2308	1.77	34.640	27.72	1.84	0.164	0.506	25
2	2548	1.74	34.648	27.73	1.95	0.174	0.497	26

CNAV OSHAWA CRUISE OS2 STATION 070 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.15	0.02		31.773
4	0.17	0.09		31.777
18	0.15	0.10		31.783
	9.03	3.60	- WATER COLUMN VALUES	

MESSENGER TIME 2015 INCOMING SOLAR RADIATION - AM 187 PM 194

CNAV OSHAWA CRUISE OS2 STATION 070 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.62	0.00	31.762	0.000	23.79	412.2	0.000	0.00	6.04	0.00	
10	13.63	0.00	31.764	0.000	23.79	412.5	0.042	0.02	6.08	0.00	
20	13.03	0.00	32.159	0.000	24.21	372.3	0.087	0.08	5.96	0.00	
30	11.53	0.01	32.550	0.009	24.80	316.6	0.116	0.17	6.63	0.02	0.99
50	10.31	0.01	32.581	0.004	25.04	294.2	0.178	0.42	6.33	0.01	0.95
75	9.49	0.02	32.680	0.010	25.25	274.5	0.249	0.88	5.68	0.02	0.89
100	8.38	0.03	33.317	0.000	25.92	211.0	0.311	1.42	4.10	0.01	0.84
150	8.07	0.01	33.856	0.005	26.39	167.4	0.406	2.61	2.76	0.01	0.79
200	7.60	0.03	33.939	0.003	26.52	155.4	0.487	4.07	2.43	0.01	0.75
250	7.01	0.01	33.978	0.002	26.63	145.1	0.563	5.81	2.23	0.00	0.65
300	6.38	0.00	33.998	0.002	26.73	136.0	0.634	7.81	1.91	0.03	1.30
400	5.40	0.00	34.043	0.002	26.89	121.5	0.764	12.44	1.28	0.03	1.07
500	4.83	0.06	34.111	0.005	27.01	110.8	0.881	17.84	0.77	0.00	0.75
600	4.51	0.05	34.191	0.005	27.11	102.1	0.989	23.90	0.45	0.00	0.72
700	4.30	0.00	34.265	0.001	27.19	95.0	1.088	30.54	0.29	0.02	0.80
800	4.02	0.00	34.321	0.001	27.27	88.6	1.181	37.69	0.26	0.03	0.60
1000	3.52	0.00	34.406	0.002	27.38	78.1	1.350	53.20	0.30	0.01	0.90
1200	3.07	0.00	34.469	0.003	27.48	69.7	1.499	70.08	0.36	0.01	0.77
1500	2.53	0.00	34.536	0.001	27.58	60.2	1.697	97.36	0.66	0.02	0.69
2000	1.93	0.00	34.611	0.001	27.69	50.0	1.977	147.24	1.46	0.02	0.77
2500	1.74	0.00	34.648	0.000	27.73	46.8	2.224	204.28	1.94	0.00	3.64

CNAV OSHAWA CRUISE OS2 STATION 071 OBSERVED VALUES

DATE 10/06/63 HR 08.2 LAT 45-24 N LONG 127-16 W SNDG 2816 WEA 03 WIND VEL 24 DIR 34
BAROM 20.0 TEMP DRY 12.2 WET 11.1 RELHU 88 WTRCLR SECDI SEA 4 DIR 34 SWELL 4 DIR 32
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	12.99	32.401	24.41	6.18	0.552	-0.030	106
1	5	12.98	32.397	24.40	6.13	0.547	-0.026	105
1	9	12.98	32.364	24.38	6.18	0.552	-0.030	106
1	18	12.97	32.396	24.41	6.15	0.549	-0.027	105
1	26	12.99	32.400	24.40	6.13	0.547	-0.026	105
1	44	10.24	32.541	25.02	6.61	0.590	-0.037	107
1	69	9.81	32.532	25.08	6.37	0.569	-0.010	102
1	88	8.60	32.899	25.56	5.10	0.455	0.117	80
1	109	8.20	33.446	26.05	3.98	0.355	0.221	62
1	130	8.28	33.752	26.27	3.02	0.270	0.304	47
1	154	7.97	33.846	26.39	2.72	0.243	0.335	42
1	176	7.69	33.904	26.48	2.54	0.227	0.354	39

CNAV OSHAWA CRUISE OS2 STATION 071 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.09	0.22		32.404
4	0.14	0.19		32.404
18	0.11	0.14		32.398
59	0.28	0.36		32.553
	10.19	13.41	- WATER COLUMN VALUES	

MESSENGER TIME 0035 INCOMING SOLAR RADIATION - AM 200 PM 314

CNAV OSHAWA CRUISE OS2 STATION 071 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E T	SAL	E S	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E O	VAR RATIO
0	12.99	0.00	32.401	0.000	24.41	353.3	0.000	0.00	6.15	0.00	
10	12.98	0.00	32.365	0.003	24.38	356.0	0.036	0.02	6.18	0.00	0.97
20	13.01	0.02	32.396	0.002	24.40	354.5	0.072	0.07	6.14	0.00	0.71
30	12.46	0.17	32.429	0.009	24.53	342.1	0.107	0.16	6.23	0.04	0.95
50	10.02	0.16	32.524	0.024	25.04	293.8	0.171	0.42	6.67	0.02	0.80
75	9.43	0.06	32.624	0.007	25.21	277.6	0.243	0.88	6.01	0.04	0.65
100	8.28	0.02	33.217	0.016	25.85	217.0	0.305	1.43	4.43	0.01	0.66
150	8.04	0.01	33.841	0.006	26.38	168.0	0.402	2.65	2.74	0.02	0.81

CNAV OSHAWA CRUISE OS2 STATION 072 OBSERVED VALUES

DATE 10/06/63 HR 11.3 LAT 45-25 N LONG 127-50 W SNDG 2926 WEA 01 WIND VEL 18 DIR 35
BAROM 21.0 TEMP DRY 12.2 WET 11.1 RELHU 88 WTRCLR SECDI SEA 3 DIR 34 SWELL 4 DIR 32
CLOUD TYPE AMT 6 VIS 7 WIRE ANGLE(S) 18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.89	32.426	24.44	6.18	0.552	-0.029	106
1	5	12.88	32.422	24.44	6.18	0.552	-0.029	106
1	10	12.89	32.421	24.44	6.13	0.547	-0.025	105
1	19	12.89	32.416	24.44	6.08	0.543	-0.020	104
1	28	12.70	32.447	24.50	6.12	0.547	-0.022	104
1	47	10.28	32.559	25.02	6.61	0.590	-0.038	107
1	71	9.86	32.623	25.14	5.95	0.531	0.026	95
1	95	8.76	33.334	25.87	4.24	0.379	0.190	67
1	118	7.93	33.598	26.21	3.90	0.348	0.231	60
1	142	7.73	33.787	26.38	3.55	0.317	0.264	55
1	167	7.51	33.889	26.49	3.20	0.286	0.298	49
1	191	7.31	33.930	26.55	2.86	0.255	0.331	44

CNAV OSHAWA CRUISE OS2 STATION 072 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.15	0.31	1.72	32.422
4	0.16	0.27		32.419
18	0.19	0.30		32.419
59	0.14	0.00		32.417
	9.87	11.30	- WATER COLUMN VALUES	

MESSENGER TIME 0337 INCOMING SOLAR RADIATION - AM 200 PM 314

CNAV OSHAWA CRUISE OS2 STATION 072 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.89	0.00	32.426	0.000	24.44	349.6	0.000	0.00	6.18	0.00	
10	12.89	0.00	32.421	0.000	24.44	350.2	0.036	0.02	6.13	0.00	
20	12.88	0.01	32.418	0.000	24.44	350.4	0.071	0.07	6.08	0.00	0.86
30	12.47	0.07	32.459	0.002	24.55	340.1	0.106	0.16	6.18	0.02	0.96
50	10.17	0.07	32.552	0.013	25.04	294.2	0.170	0.42	6.60	0.01	0.86
75	9.69	0.02	32.734	0.025	25.26	273.6	0.241	0.88	5.65	0.06	0.80
100	8.54	0.01	33.412	0.009	25.97	206.4	0.302	1.41	4.11	0.04	0.75
150	7.66	0.00	33.828	0.001	26.43	163.6	0.395	2.58	3.44	0.00	0.69

CNAV OSHAWA CRUISE OS2 STATION 073 OBSERVED VALUES

DATE 10/06/63 HR 19.4 LAT 45-24 N LONG 130-00 W SNDG 2395 WEA 41 WIND VEL 20 DIR 34
BAROM 22.0 TEMP DRY 13.3 WET 11.7 RELHU 83 WTRCLR SECDI SEA 3 DIR 34 SWELL 4 DIR
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 15,25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.73	32.593	24.60	6.33	0.565	-0.041	108
1	5	12.70	32.593	24.61	6.18	0.552	-0.028	105
1	10	12.71	32.595	24.61	6.26	0.559	-0.035	107
1	20	12.69	32.590	24.61	6.20	0.554	-0.029	106
1	30	12.68	32.593	24.61	6.24	0.557	-0.033	106
1	49	10.02	32.574	25.08	6.69	0.598	-0.042	107
1	73	9.63	32.588	25.15	6.47	0.578	-0.017	103
1	98	9.15	32.640	25.27	6.15	0.549	0.017	97
1	123	8.31	33.275	25.90	4.64	0.414	0.161	72
1	147	7.68	33.660	26.29	3.77	0.337	0.246	58
1	172	7.49	33.871	26.48	3.25	0.290	0.294	50
2	182	7.38	33.858	26.49	3.14	0.280	0.305	48
2	227	6.82	33.928	26.62	2.83	0.253	0.340	43
2	273	6.30	33.946	26.70	2.53	0.226	0.375	38
2	460	5.01	34.077	26.96	1.03	0.092	0.528	15
2	697	4.02	34.240	27.20	0.35	0.031	0.603	5
2	1442	3.02	34.473	27.48	0.54	0.048	0.601	7
2	1741	2.15	34.576	27.64	1.27	0.113	0.551	17

CNAV OSHAWA CRUISE OS2 STATION 073 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.09	0.20	0.72				32.587	0.60	0.4	1
7	0.09	0.18	1.78	0.19	100	50	32.588	0.57	0.6	1
				0.34	66					
				0.10	50					
				0.08	33					
				0.03	18					
				0.02	6					
27	0.08	0.16	0.14			10	32.592	0.59	0.4	1
66	0.10	0.10	0.56			1	32.593	0.58	0.4	0
	5.90	9.85	41.62	- WATER COLUMN VALUES						

MESSENGER TIME 1142 INCOMING SOLAR RADIATION - AM 200 PM 314

LIGHT SATURATION INCUBATOR ILLUMINATION 18600

CNAV OSHAWA CRUISE OS2 STATION 073 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.73	0.00	32.593	0.000	24.60	334.4	0.000	0.00	6.33	0.00	
10	12.71	0.00	32.595	0.000	24.61	334.1	0.034	0.02	6.26	0.00	
20	12.69	0.00	32.590	0.000	24.61	334.3	0.068	0.07	6.20	0.00	
30	12.68	0.00	32.593	0.000	24.61	334.1	0.101	0.16	6.24	0.00	
50	9.97	0.02	32.574	0.000	25.09	289.4	0.164	0.41	6.69	0.01	0.95
75	9.60	0.00	32.581	0.007	25.15	283.5	0.236	0.87	6.47	0.01	0.89
100	9.09	0.01	32.684	0.010	25.32	268.4	0.306	1.49	6.04	0.02	0.89
150	7.65	0.01	33.689	0.004	26.32	173.8	0.417	2.86	3.69	0.01	0.89
200	7.17	0.01	33.931	0.026	26.58	150.0	0.499	4.32	2.96	0.03	0.85
250	6.55	0.00	33.940	0.002	26.67	141.8	0.573	6.01	2.68	0.00	0.59
300	6.06	0.02	33.962	0.002	26.75	134.5	0.642	7.98	2.30	0.03	1.23
400	5.33	0.03	34.030	0.003	26.89	121.6	0.772	12.59	1.49	0.05	1.10
500	4.81	0.01	34.106	0.001	27.01	110.9	0.889	17.99	0.85	0.02	0.84
600	4.36	0.02	34.176	0.001	27.12	101.5	0.996	24.03	0.52	0.04	0.61
700	4.01	0.00	34.241	0.000	27.20	93.5	1.095	30.60	0.34	0.00	1.00
800	3.84	0.10	34.284	0.009	27.26	89.2	1.187	37.71	0.20	0.02	1.10
1000	3.52	0.20	34.358	0.018	27.35	81.6	1.360	53.65	0.07	0.05	1.29
1200	3.26	0.18	34.419	0.017	27.42	75.6	1.519	71.62	0.16	0.04	1.20
1500	2.91	0.01	34.489	0.001	27.51	68.2	1.738	101.89	0.66	0.00	20.01

CNAV OSHAWA CRUISE OS2 STATION 074 OBSERVED VALUES

DATE 11/06/63 HR 00.7 LAT 46-12 N LONG 130-00 W SNDG WEA 02 WIND VEL 20 DIR 34
BAROM 21.0 TEMP DRY 15.0 WET 13.9 RELHU 89 WTRCLR SECDI SEA 3 DIR 34 SWELL 3 DIR 34
CLOUD TYPE AMT 4 VIS 7 WIRE ANGLE(S) 11,25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	12.72	32.560	24.58	6.34	0.566	-0.042	108
1	5	12.67	32.556	24.59	6.32	0.564	-0.040	108
1	10	12.58	32.553	24.60	6.37	0.569	-0.043	108
1	20	12.50	32.567	24.63	6.28	0.561	-0.034	107
1	30	10.87	32.578	24.94	6.60	0.589	-0.044	108
1	49	10.00	32.582	25.09	6.34	0.566	-0.010	102
1	74	9.32	32.544	25.17	6.51	0.581	-0.017	103
1	98	8.95	32.771	25.40	5.76	0.514	0.054	90
1	123	7.26	32.951	25.79	5.72	0.511	0.080	86
1	147	7.13	33.512	26.25	4.77	0.426	0.165	72
1	173	7.11	33.811	26.49	4.04	0.361	0.229	61
2	183	7.11	33.830	26.50	4.03	0.360	0.230	61
2	229	6.48	33.911	26.65	3.46	0.309	0.289	52
2	275	5.83	33.917	26.74	2.95	0.263	0.344	43
2	460	4.52	34.021	26.98	1.20	0.107	0.520	17
2	687	3.96	34.216	27.19	0.43	0.038	0.597	6
2	924	3.39	34.341	27.34	0.30	0.027	0.617	4
2	1405	2.51	34.503	27.55	0.68	0.061	0.597	9
2	1693	2.13	34.572	27.64	1.23	0.110	0.555	17

CNAV OSHAWA CRUISE OS2 STATION 074 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.26	0.37		32.608
7	0.29	0.37		32.565
27	0.24	0.39		32.566
66	0.40	0.13		32.587
	19.77	20.38	- WATER COLUMN VALUES	

MESSENGER TIME 1745 INCOMING SOLAR RADIATION - AM 200 PM 314

CNAV OSHAWA CRUISE OS2 STATION 074 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.72	0.00	32.560	0.000	24.58	336.6	0.000	0.00	6.34	0.00	
10	12.58	0.00	32.553	0.000	24.60	334.8	0.034	0.02	6.37	0.00	
20	12.50	0.00	32.567	0.000	24.63	332.5	0.068	0.07	6.28	0.00	
30	10.87	0.00	32.578	0.000	24.94	303.4	0.100	0.15	6.60	0.00	
50	9.96	0.00	32.578	0.002	25.09	289.0	0.160	0.39	6.35	0.01	0.95
75	9.31	0.01	32.551	0.002	25.18	281.3	0.231	0.85	6.48	0.01	0.94
100	8.81	0.04	32.779	0.006	25.43	257.3	0.299	1.46	5.76	0.02	0.89
150	7.13	0.01	33.555	0.005	26.28	176.7	0.409	2.81	4.68	0.01	0.89
200	6.89	0.01	33.910	0.028	26.60	147.8	0.490	4.26	3.70	0.07	0.86
250	6.18	0.01	33.918	0.003	26.70	138.7	0.563	5.93	3.22	0.00	0.60
300	5.57	0.03	33.926	0.002	26.78	131.2	0.631	7.85	2.67	0.01	1.21
400	4.79	0.05	33.978	0.003	26.91	119.2	0.757	12.36	1.69	0.02	1.10
500	4.38	0.03	34.055	0.004	27.02	109.7	0.873	17.68	0.99	0.02	0.82
600	4.11	0.04	34.141	0.006	27.11	101.1	0.979	23.68	0.60	0.03	0.67
700	3.93	0.00	34.224	0.000	27.20	93.8	1.078	30.24	0.41	0.00	0.93
800	3.68	0.00	34.282	0.002	27.27	87.5	1.169	37.30	0.31	0.02	0.60
1000	3.23	0.00	34.373	0.001	27.39	77.3	1.336	52.64	0.31	0.00	0.94
1200	2.84	0.00	34.445	0.003	27.48	68.9	1.484	69.32	0.42	0.01	0.89
1500	2.37	0.00	34.527	0.000	27.58	59.2	1.679	96.18	0.84	0.00	9.21

CNAV OSHAWA CRUISE OS2 STATION 075 OBSERVED VALUES

DATE 11/06/63 HR 05.6 LAT 46-58 N LONG 130-00 W SNDG 2560 WEA 45 WIND VEL 18 DIR 30
BAROM 18.0 TEMP DRY 12.[illegible] WET 12.2 RELHU 99 WTRCLR SECDI SEA 3 DIR 30 SWELL 3 DIR 32
CLOUD TYPE AMT 9 VIS 3 WIRE ANGLE(S) 22,22

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.14	32.440	24.60	6.42	0.573	-0.042	108
1	5	12.13	32.436	24.60	6.52	0.582	-0.051	110
1	9	12.14	32.440	24.60	6.53	0.583	-0.052	110
1	18	11.91	32.435	24.64	6.46	0.577	-0.043	108
1	27	11.79	32.447	24.67	6.54	0.584	-0.049	109
1	45	9.47	32.494	25.11	6.79	0.606	-0.043	108
1	68	9.27	32.523	25.16	6.33	0.565	0.000	100
1	90	8.87	32.539	25.24	6.33	0.565	0.005	99
1	123	7.48	33.093	25.87	5.08	0.454	0.134	77
1	136	7.16	33.537	26.27	4.19	0.374	0.226	63
1	159	7.12	33.828	26.50	3.46	0.309	0.281	52
2	181	6.99	33.882	26.56	3.30	0.295	0.296	50
2	226	6.43	33.926	26.67	2.87	0.256	0.343	43
2	272	5.87	33.933	26.75	2.41	0.215	0.392	35
2	455	4.69	34.050	26.98	1.08	0.096	0.528	15
2	681	3.95	34.223	27.20	0.39	0.035	0.601	5
2	908	3.40	34.336	27.34	0.29	0.026	0.618	4
2	1362	2.55	34.502	27.55	0.60	0.054	0.604	8
2	1658	2.20	34.556	27.62	0.96	0.086	0.578	13

CNAV OSHAWA CRUISE OS2 STATION 075 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.55	0.40		32.442
7	0.57	0.39		32.441
27	0.59	0.37		32.425
66	0.16	0.03		32.527
100				32.528
	30.01	18.40	- WATER COLUMN VALUES	

MESSENGER TIME 2147 INCOMING SOLAR RADIATION - AM 200 PM 314

CNAV OSHAWA CRUISE OS2 STATION 075 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.14	0.00	32.440	0.000	24.60	334.9	0.000	0.00	6.42	0.00	
10	12.12	0.01	32.440	0.000	24.60	334.8	0.034	0.02	6.52	0.00	0.97
20	11.91	0.02	32.437	0.000	24.64	331.5	0.068	0.07	6.47	0.00	0.75
30	11.43	0.11	32.455	0.001	24.74	322.1	0.101	0.15	6.60	0.02	0.93
50	9.30	0.09	32.502	0.001	25.14	284.3	0.162	0.40	6.71	0.04	0.79
75	9.18	0.01	32.513	0.011	25.17	282.0	0.233	0.86	6.34	0.04	0.67
100	8.46	0.06	32.630	0.006	25.37	263.1	0.302	1.47	6.11	0.00	0.91
150	7.10	0.03	33.766	0.015	26.46	160.6	0.409	2.78	3.65	0.02	0.75
200	6.78	0.02	33.908	0.002	26.61	146.5	0.486	4.16	3.13	0.00	0.83
250	6.13	0.00	33.931	0.002	26.71	137.1	0.557	5.80	2.63	0.00	0.58
300	5.62	0.02	33.946	0.002	26.79	130.3	0.625	7.71	2.16	0.00	1.22
400	4.93	0.04	34.006	0.004	26.92	118.7	0.750	12.19	1.40	0.00	1.06
500	4.50	0.02	34.086	0.002	27.03	108.9	0.865	17.48	0.88	0.01	0.80
600	4.16	0.02	34.163	0.003	27.13	100.1	0.971	23.43	0.54	0.02	0.69
700	3.90	0.00	34.234	0.000	27.21	92.8	1.068	29.93	0.37	0.01	0.89
800	3.64	0.00	34.287	0.001	27.28	86.8	1.159	36.91	0.29	0.02	0.59
1000	3.20	0.00	34.377	0.000	27.39	76.6	1.324	52.12	0.31	0.01	0.92
1200	2.81	0.00	34.453	0.001	27.49	67.9	1.471	68.61	0.43	0.01	0.85
1500	2.37	0.00	34.533	0.000	27.59	58.6	1.663	95.16	0.76	0.00	7.63

CNAV OSHAWA CRUISE OS2 STATION 076 OBSERVED VALUES

DATE 11/06/63 HR 10.3 LAT 47-43 N LONG 130-00 W SNDG 2926 WEA 45 WIND VEL 20 DIR 29
BAROM 15.0 TEMP DRY 11.7 WET 11.7 RELHU 99 WTRCLR SECDI SEA 2 DIR 29 SWELL 1 DIR 32
CLOUD TYPE AMT 9 VIS 5 WIRE ANGLE(S) 18, 8

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN
1	0	12.07	32.456	24.62	6.38	0.570	-0.038	107
1	5	12.05	32.461	24.63	6.40	0.572	-0.040	107
1	9	12.07	32.459	24.63	6.36	0.568	-0.036	107
1	18	11.88	32.501	24.69	6.40	0.572	-0.038	107
1	28	11.53	32.462	24.73	6.31	0.564	-0.026	105
1	46	9.02	32.465	25.15	6.48	0.579	-0.010	102
1	69	8.74	32.502	25.23	6.37	0.569	0.004	99
1	93	8.01	32.729	25.51	5.84	0.522	0.060	90
2	115	7.95	32.747	25.54	5.80	0.518	0.064	89
1	116	6.87	33.205	26.05	5.19	0.464	0.132	78
1	140	6.62	33.530	26.33	4.73	0.422	0.175	71
2	151	6.64	33.483	26.29	4.72	0.422	0.176	71
1	164	6.63	33.715	26.48	4.27	0.381	0.215	64
2	192	6.52	33.865	26.61	3.72	0.332	0.266	56
2	362	4.90	34.016	26.93	1.34	0.120	0.502	19
2	587	4.10	34.169	27.14	0.57	0.051	0.582	8
2	827	3.49	34.316	27.32	0.35	0.031	0.611	5
2	1323	2.59	34.476	27.53	0.52	0.046	0.611	7
2	1822	2.04	34.569	27.65	1.27	0.113	0.553	17
2	2323	1.79	34.631	27.71	1.80	0.161	0.509	24
2	2673	1.70	34.646	27.73	2.15	0.192	0.480	29

CNAV OSHAWA CRUISE OS2 STATION 076 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.38	0.62	7.30	32.462
7	0.38	0.42		32.458
27	0.38	0.47		32.460
66	0.37	0.18		32.498
100	0.11	0.01		32.584
	24.98	25.22	- WATER COLUMN VALUES	

MESSENGER TIME 0400 INCOMING SOLAR RADIATION - AM 195 PM 208

CNAV OSHAWA CRUISE OS2 STATION 076 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.07	0.00	32.456	0.000	24.62	332.5	0.000	0.00	6.38	0.00	
10	12.06	0.00	32.464	0.002	24.63	331.9	0.034	0.02	6.36	0.00	0.97
20	11.85	0.02	32.496	0.003	24.70	326.0	0.067	0.07	6.38	0.01	0.78
30	11.26	0.07	32.459	0.001	24.77	318.7	0.100	0.15	6.32	0.01	0.93
50	8.87	0.09	32.464	0.003	25.18	280.7	0.160	0.40	6.49	0.00	0.82
75	8.55	0.04	32.560	0.013	25.30	269.2	0.229	0.84	6.23	0.03	0.74
100	7.75	0.12	32.823	0.045	25.62	238.8	0.293	1.41	5.70	0.05	0.68
150	6.62	0.02	33.546	0.052	26.35	170.6	0.396	2.69	4.64	0.07	0.63
200	6.45	0.02	33.887	0.009	2o.64	143.8	0.476	4.10	3.57	0.00	1.18
250	6.01	0.09	33.992	0.048	26.78	131.1	0.545	5.69	2.73	0.00	2.12
300	5.53	0.10	34.038	0.049	26.87	122.4	0.609	7.49	2.02	0.00	1.79
400	4.70	0.03	34.044	0.001	26.97	113.3	0.728	11.74	1.10	0.05	0.83
500	4.31	0.05	34.114	0.001	27.07	104.5	0.838	16.81	0.67	0.09	0.68
600	4.06	0.00	34.178	0.000	27.15	97.9	0.940	22.57	0.55	0.00	0.93
700	3.79	0.01	34.242	0.001	27.23	91.0	1.035	28.93	0.42	0.02	0.61
800	3.55	0.00	34.301	0.000	27.30	84.7	1.124	35.77	0.35	0.01	0.81
1000	3.13	0.01	34.387	0.005	27.41	75.1	1.286	50.65	0.33	0.01	0.86
1200	2.77	0.00	34.448	0.004	27.49	67.8	1.431	66.97	0.41	0.01	0.79
1500	2.36	0.00	34.515	0.001	27.58	59.9	1.625	93.80	0.77	0.03	0.67
2000	1.93	0.01	34.596	0.001	27.68	51.1	1.907	144.08	1.47	0.01	0.71
2500	1.74	0.00	34.642	0.000	27.73	47.2	2.157	201.97	1.97	0.00	2.78

CNAV OSHAWA CRUISE OS2 STATION 077 OBSERVED VALUES

DATE 11/06/63 HR 15.9 LAT 47-43 N LONG 128-55 W SNDG 2578 WEA 41 WIND VEL 20 DIR 27
BAROM 14.0 TEMP DRY 13.3 WET 12.8 RELHU 95 WTRCLR SECDI SEA 3 DIR 27 SWELL 2 DIR 32
CLOUD TYPE AMT 8 VIS 5 WIRE ANGLE(S) 7,--

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	11.94	32.348	24.56	6.37	0.569	-0.035	107
1	5	11.93	32.347	24.57	6.50	0.581	-0.047	109
1	10	11.93	32.343	24.56	6.38	0.570	-0.036	107
1	19	11.92	32.346	24.57	6.40	0.572	-0.038	107
1	29	11.80	32.345	24.59	6.24	0.557	-0.022	104
1	49	9.28	32.304	24.99	6.50	0.581	-0.014	103
1	73	8.78	32.453	25.18	6.14	0.548	0.024	96
1	97	8.92	32.964	25.56	4.98	0.445	0.124	78
1	122	7.55	33.495	26.18	3.88	0.347	0.238	59
1	146	7.39	33.747	26.40	3.38	0.302	0.284	52
1	172	7.17	33.870	26.53	2.98	0.266	0.322	45
2	186	7.05	33.884	26.55	3.04	0.272	0.319	46
2	233	6.58	33.921	26.65	2.92	0.261	0.336	44
2	280	6.04	33.952	26.74	2.24	0.200	0.404	33
2	467	5.91	34.070	26.85	0.95	0.085	0.521	14
2	701	4.11	34.262	27.21	0.30	0.027	0.606	4
2	935	3.54	34.384	27.36	0.28	0.025	0.616	4
2	1417	2.60	34.509	27.55	0.63	0.056	0.600	9
2	1711	2.71	34.566	27.59	1.06	0.095	0.560	14

CNAV OSHAWA CRUISE OS2 STATION 077 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.75	1.26		32.348
7	0.81	1.88		32.352
27	0.96	1.29		32.346
66	0.25	0.11		32.369
	46.65	69.99	- WATER COLUMN VALUES	

MESSENGER TIME 0806 INCOMING SOLAR RADIATION - AM 195 PM 208

CNAV OSHAWA CRUISE OS2 STATION 077 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.94	0.00	32.348	0.000	24.56	338.1	0.000	0.00	6.37	0.00	
10	11.93	0.00	32.343	0.000	24.56	338.5	0.035	0.02	6.38	0.00	
20	11.93	0.01	32.346	0.000	24.57	338.5	0.069	0.07	6.38	0.01	0.88
30	11.69	0.04	32.342	0.002	24.61	334.8	0.103	0.16	6.25	0.01	0.98
50	9.23	0.01	32.304	0.001	25.00	297.8	0.166	0.42	6.50	0.00	0.95
75	8.81	0.03	32.489	0.005	25.21	278.3	0.239	0.88	6.06	0.01	0.89
100	8.76	0.05	33.035	0.005	25.64	237.6	0.304	1.46	4.83	0.01	0.85
150	7.36	0.00	33.775	0.001	26.43	163.4	0.405	2.70	3.29	0.01	0.83
200	6.92	0.00	33.896	0.000	26.58	149.2	0.484	4.11	3.06	0.00	1.18
250	6.38	0.01	33.933	0.000	26.68	140.1	0.557	5.79	2.70	0.03	0.65
300	5.98	0.07	33.964	0.001	26.76	133.4	0.626	7.74	2.03	0.03	1.16
400	5.84	0.17	34.026	0.002	26.83	128.2	0.758	12.47	1.24	0.06	1.13
500	5.67	0.06	34.098	0.002	26.90	122.1	0.884	18.30	0.81	0.01	0.85
600	4.92	0.12	34.180	0.005	27.06	107.8	1.000	24.83	0.48	0.02	0.67
700	4.12	0.00	34.261	0.000	27.21	93.3	1.102	31.58	0.30	0.00	0.99
800	3.79	0.05	34.320	0.001	27.29	86.0	1.192	38.55	0.25	0.02	0.62
1000	3.36	0.02	34.407	0.003	27.40	76.2	1.356	53.65	0.30	0.00	0.95
1200	2.92	0.04	34.466	0.005	27.49	68.2	1.503	70.14	0.41	0.00	0.89
1500	2.68	0.07	34.524	0.001	27.56	62.9	1.702	97.75	0.74	0.00	10.32

CNAV OSHAWA CRUISE OS2 STATION 078 OBSERVED VALUES

DATE 11/06/63 HR 19.1 LAT 47-43 N LONG 128-27 W SNDG 2633 WEA 41 WIND VEL 12 DIR 29
BAROM 14.0 TEMP DRY 14.4 WET 13.3 RELHU 89 WTRCLR SECDI SEA 2 DIR 29 SWELL 2 DIR 31
CLOUD TYPE AMT 8 VIS 6 WIRE ANGLE(S) 11

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	12.13	32.296	24.49	6.46	0.577	-0.045	109
1	5	12.08	32.284	24.49	6.48	0.579	-0.046	109
1	10	12.08	32.291	24.49	6.38	0.570	-0.038	107
1	20	12.01	32.291	24.51	6.37	0.569	-0.036	107
1	29	12.00	32.291	24.51	6.38	0.570	-0.037	107
1	48	9.43	32.414	25.05	6.50	0.581	-0.017	103
1	73	8.88	32.424	25.14	6.27	0.560	0.011	98
1	97	7.85	32.978	25.73	5.05	0.451	0.132	77
1	122	7.07	33.425	26.19	4.59	0.410	0.182	69
1	146	7.19	33.704	26.39	4.07	0.364	0.225	62
1	172	7.13	33.865	26.53	3.19	0.285	0.304	48
1	197	6.86	33.912	26.60	2.96	0.264	0.328	45
1	246	6.20	33.941	26.71	2.43	0.217	0.385	36
1	295	5.68	33.941	26.78	2.24	0.200	0.410	33

CNAV OSHAWA CRUISE OS2 STATION 078 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.48	0.56	3.96				32.282	0.62	0.1	6
6	0.54	0.55	2.62			50	32.281	0.70	0.3	8
25	0.62	0.55	0.66	0.75	100	10	32.295	0.69	0.3	8
				0.66	66					
				0.52	50					
				0.48	33					
				0.21	18					
				0.01	6					
60	0.48	0.37	0.00			1	32.287	0.66	0.3	7
	33.29	29.88	62.44	- WATER COLUMN VALUES						

MESSENGER TIME 1139 INCOMING SOLAR RADIATION - AM 195 PM 208

LIGHT SATURATION INCUBATOR ILLUMINATION 18500

CNAV OSHAWA CRUISE OS2 STATION 078 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.13	0.00	32.296	0.000	24.49	345.3	0.000	0.00	6.46	0.00	
10	12.08	0.00	32.291	0.000	24.49	345.0	0.035	0.02	6.38	0.00	
20	12.01	0.00	32.291	0.000	24.51	344.0	0.070	0.07	6.37	0.00	
30	11.88	0.04	32.297	0.002	24.54	341.6	0.105	0.16	6.39	0.00	0.98
50	9.34	0.05	32.407	0.009	25.06	291.9	0.168	0.42	6.51	0.01	0.91
75	8.80	0.01	32.462	0.008	25.19	280.1	0.240	0.88	6.17	0.02	0.88
100	7.72	0.01	33.039	0.000	25.80	222.4	0.304	1.44	4.98	0.02	0.85
150	7.19	0.00	33.737	0.001	26.42	164.0	0.401	2.65	3.92	0.02	0.82
200	6.82	0.00	33.915	0.001	26.61	146.5	0.479	4.04	2.92	0.00	0.97
250	6.15	0.00	33.950	0.005	26.73	135.9	0.550	5.68	2.39	0.00	13.66

CNAV OSHAWA CRUISE OS2 STATION 079 OBSERVED VALUES

DATE 11/06/63 HR 21.6 LAT 47-43 N LONG 127-50 W SNDG 3017 WEA 01 WIND VEL 14 DIR 28
BAROM 13.0 TEMP DRY 15.6 WET 14.4 RELHU 88 WTRCLR SECDI SEA 2 DIR 28 SWELL 1 DIR
CLOUD TYPE AMT 8 VIS 7 WIRE ANGLE(S) 20,35

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.86	32.351	24.39	6.74	0.602	-0.079	115
1	5	12.81	32.349	24.40	6.33	0.565	-0.041	108
1	10	12.78	32.346	24.40	6.23	0.556	-0.032	106
1	19	12.68	32.356	24.43	6.31	0.564	-0.038	107
1	29	12.53	32.364	24.47	6.23	0.556	-0.029	106
1	49	9.66	32.486	25.07	6.57	0.587	-0.026	105
1	73	9.27	32.486	25.13	6.40	0.572	-0.006	101
1	97	8.63	32.659	25.37	5.91	0.528	0.046	92
1	122	7.09	33.148	25.97	5.29	0.472	0.120	80
1	146	7.02	33.477	26.24	4.54	0.405	0.181	68
1	171	7.18	33.780	26.46	2.86	0.255	0.333	43
2	155	7.38	33.719	26.38	3.47	0.310	0.276	53
2	193	7.13	33.908	26.56	3.15	0.281	0.308	48
2	233	6.49	33.926	26.66	2.98	0.266	0.332	45
2	405	5.17	34.046	26.92	1.06	0.095	0.522	15
2	631	4.31	34.212	27.15	0.35	0.032	0.598	5
2	869	3.88	34.354	27.31	0.27	0.024	0.612	4
2	1361	2.91	34.510	27.52	0.65	0.058	0.593	9
2	1659	2.47	34.562	27.60	1.06	0.095	0.564	14

CNAV OSHAWA CRUISE OS2 STATION 079 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.41	0.59		32.359
6	0.71	0.49		32.359
25	0.52	0.48		32.364
60	0.51	0.05		32.365
	33.06	21.60	- WATER COLUMN VALUES	

MESSENGER TIME 1447 INCOMING SOLAR RADIATION - AM 195 PM 208

CNAV OSHAWA CRUISE OS2 STATION 079 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.86	0.00	32.351	0.000	24.39	354.6	0.000	0.00	6.74	0.00	
10	12.78	0.00	32.346	0.000	24.40	353.7	0.036	0.02	6.23	0.00	
20	12.69	0.01	32.356	0.001	24.43	351.4	0.072	0.07	6.30	0.01	0.88
30	12.40	0.05	32.370	0.002	24.50	345.4	0.107	0.16	6.24	0.01	0.98
50	9.61	0.02	32.486	0.002	25.08	290.3	0.171	0.42	6.57	0.00	0.95
75	9.24	0.01	32.492	0.001	25.14	284.5	0.243	0.88	6.37	0.00	0.89
100	8.43	0.04	32.713	0.008	25.44	256.5	0.311	1.49	5.84	0.00	0.85
150	7.13	0.06	33.566	0.025	26.29	175.8	0.420	2.84	4.17	0.11	0.61
200	7.03	0.01	33.918	0.005	26.58	149.1	0.502	4.29	3.12	0.01	0.81
250	6.29	0.03	33.936	0.001	26.70	138.8	0.575	5.96	2.81	0.05	1.19
300	5.80	0.07	33.968	0.003	26.78	130.9	0.643	7.88	2.28	0.12	1.47
400	5.19	0.01	34.042	0.000	26.92	119.1	0.769	12.39	1.12	0.01	0.95
500	4.72	0.02	34.117	0.002	27.03	109.0	0.884	17.69	0.60	0.06	0.69
600	4.39	0.01	34.190	0.001	27.12	100.7	0.990	23.66	0.38	0.03	0.82
700	4.16	0.02	34.257	0.000	27.20	94.1	1.088	30.22	0.29	0.02	0.70
800	3.98	0.02	34.317	0.000	27.27	88.4	1.181	37.32	0.25	0.02	0.64
1000	3.61	0.01	34.409	0.003	27.38	79.0	1.350	52.91	0.32	0.01	0.92
1200	3.22	0.02	34.474	0.004	27.47	71.0	1.502	70.04	0.46	0.01	0.88
1500	2.68	0.00	34.535	0.001	27.57	62.1	1.704	97.99	0.84	0.00	7.55

CNAV OSHAWA CRUISE OS2 STATION 080 OBSERVED VALUES

DATE 12/06/63 HR 00.6 LAT 47-43 N LONG 127-20 W SNDG 2560 WEA 02 WIND VEL 14 DIR 30
BAROM 13.0 TEMP DRY 15.6 WET 13.9 RELHU 83 WTRCLR SECDI SEA 3 DIR 30 SWELL 2 DIR 27
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 12

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.32	32.020	24.05	6.17	0.551	-0.032	105
1	5	13.27	32.021	24.06	6.17	0.551	-0.031	106
1	10	13.22	32.034	24.08	6.18	0.552	-0.031	106
1	20		32.169		6.13	0.547		
1	34		32.217		6.23	0.556		
1	54		32.408		6.69	0.598		
1	78		32.448		6.34	0.566		
1	103		33.006		5.32	0.475		
1	128		33.367		4.93	0.440		
1	152		33.614		4.36	0.389		
1	177		33.833		3.74	0.334		
1	201		33.897		3.53	0.315		
1	250		33.934		2.69	0.240		
1	299		33.963		1.85	0.165		

CNAV OSHAWA CRUISE OS2 STATION 080 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.32	0.00	32.020	0.000	24.05	387.5	0.000	0.00	6.17	0.00	
10	13.22	0.00	32.034	0.000	24.08	384.8	0.039	0.02	6.18	0.00	
20			32.169	0.000					6.13	0.00	
30			32.208	0.008					6.18	0.00	0.68
50			32.370	0.008					6.61	0.03	0.75
75			32.435	0.013					6.43	0.01	0.83
100			32.930	0.013					5.44	0.02	0.84
150			33.596	0.001					4.41	0.00	0.88
200			33.896	0.001					3.54	0.00	0.92
250			33.934	0.000					2.69	0.00	

CNAV OSHAWA CRUISE OS2 STATION 081 OBSERVED VALUES

DATE 12/06/63 HR 02.8 LAT 47-43 N LONG 126-44 W SNDG 2377 WEA 03 WIND VEL 10 DIR 30
BAROM 12.0 TEMP DRY 14.4 WET 12.8 RELHU 83 WTRCLR SECDI SEA 2 DIR 30 SWELL 2 DIR 34
CLOUD TYPE AMT 7 VIS 7 WIRE ANGLE(S) 15,32

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.01	31.693	23.86	6.15	0.549	-0.025	105
1	5	12.98	31.687	23.86	6.14	0.548	-0.024	105
1	10	12.98	31.709	23.87	6.15	0.549	-0.025	105
1	20	12.84	31.718	23.91	6.14	0.548	-0.023	104
1	29	12.68	31.804	24.00	6.18	0.552	-0.025	105
1	48	9.75	32.514	25.08	6.53	0.583	-0.024	104
1	72	9.50	32.515	25.12	6.37	0.569	-0.006	101
1	96	9.05	32.614	25.27	6.04	0.539	0.029	95
1	121	7.28	33.126	25.93	5.20	0.464	0.126	79
1	145	6.93	33.500	26.27	4.72	0.422	0.172	71
1	169	7.08	33.725	26.43	4.17	0.372	0.218	63
2	170	7.12	33.774	26.46	4.01	0.358	0.231	61
2	212	6.70	33.913	26.63	3.42	0.305	0.289	51
2	255	6.15	33.919	26.70	2.99	0.267	0.336	44
2	432	4.83	34.008	26.93	1.33	0.119	0.504	19
2	655	4.28	34.217	27.16	0.37	0.033	0.597	5
2	887	3.62	34.349	27.33	0.25	0.022	0.618	3
2	1364	2.72	34.496	27.53	0.57	0.051	0.604	8
2	1658	2.30	34.545	27.60	0.92	0.082	0.579	12

CNAV OSHAWA CRUISE OS2 STATION 081 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.15	0.22		31.694
6	0.17	0.09		31.697
25	0.15	0.07		31.694
60	0.40	0.09		32.488
	13.66	5.29	- WATER COLUMN VALUES	

MESSENGER TIME 1940 INCOMING SOLAR RADIATION - AM 195 PM 208

CNAV OSHAWA CRUISE OS2 STATION 081 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.01	0.00	31.693	0.000	23.86	405.8	0.000	0.00	6.15	0.00	
10	12.98	0.00	31.709	0.000	23.87	404.3	0.041	0.02	6.15	0.00	
20	12.84	0.00	31.718	0.000	23.91	401.2	0.082	0.08	6.14	0.00	
30	12.54	0.05	31.840	0.011	24.06	386.9	0.122	0.19	6.20	0.01	0.98
50	9.66	0.05	32.531	0.014	25.10	287.7	0.190	0.45	6.53	0.01	0.91
75	9.48	0.02	32.514	0.005	25.12	286.6	0.262	0.92	6.35	0.01	0.84
100	8.76	0.06	32.686	0.012	25.37	263.4	0.331	1.54	5.91	0.02	0.81
150	6.96	0.02	33.563	0.002	26.31	173.8	0.441	2.89	4.58	0.02	0.77
200	6.86	0.02	33.888	0.001	26.58	149.1	0.523	4.34	3.59	0.01	0.75
250	6.21	0.00	33.922	0.002	26.70	138.9	0.595	6.01	3.04	0.00	0.78
300	5.71	0.02	33.933	0.001	26.77	132.3	0.664	7.94	2.52	0.02	1.36
400	4.98	0.02	33.986	0.001	26.90	120.9	0.791	12.50	1.59	0.02	0.94
500	4.60	0.05	34.070	0.007	27.01	111.1	0.908	17.90	0.93	0.02	0.73
600	4.36	0.04	34.164	0.006	27.11	102.3	1.016	23.97	0.51	0.01	0.73
700	4.15	0.01	34.248	0.001	27.19	94.6	1.116	30.60	0.30	0.02	0.78
800	3.86	0.01	34.307	0.002	27.27	87.8	1.208	37.70	0.23	0.03	0.60
1000	3.37	0.01	34.395	0.003	27.39	77.2	1.375	53.05	0.28	0.01	0.93
1200	2.98	0.01	34.460	0.003	27.48	69.3	1.523	69.78	0.40	0.02	0.88
1500	2.52	0.00	34.520	0.001	27.57	61.4	1.722	97.25	0.73	0.00	7.64

CNAV OSHAWA CRUISE OS2 STATION 082 OBSERVED VALUES

DATE 12/06/63 HR 05.8 LAT 47-43 N LONG 126-08 W SNDG 1829 WEA 01 WIND VEL 18 DIR 33
BAROM 14.0 TEMP DRY 12.8 WET 11.1 RELHU 82 WTRCLR SECDI SEA 2 DIR 33 SWELL 2 DIR 34
CLOUD TYPE AMT 7 VIS 6 WIRE ANGLE(S) --

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	13.01	31.891	24.01	6.12	0.547	-0.023	104
1	5	13.00	31.896	24.01	6.18	0.552	-0.029	105
1	9	12.97	31.896	24.02	6.18	0.552	-0.028	105
1	18	12.83	31.933	24.08	6.16	0.550	-0.025	105
1	27	10.34	32.263	24.78	6.68	0.597	-0.044	108
1	46	9.44	32.400	25.04	6.04	0.539	0.024	96
1	68	8.68	32.808	25.47	5.12	0.457	0.115	80
1	92	7.71	33.142	25.88	4.96	0.443	0.141	76
1	114	7.29	33.495	26.22	3.98	0.355	0.233	60
1	137	7.81	33.768	26.36	2.87	0.256	0.324	44
1	161	7.50	33.864	26.48	2.71	0.242	0.342	41
1	183	7.34	33.919	26.54	2.44	.218	0.368	37
1	230	6.78	33.948	26.64	2.37	0.212	0.382	36
1	275	6.12	33.969	26.75	2.08	0.186	0.417	31

CNAV OSHAWA CRUISE OS2 STATION 082 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.73	0.08		31.888
6	0.12	0.12		31.902
25	0.38	0.21		32.060
60	0.19	0.09		32.607
100	0.01	0.03		33.240
	17.33	8.94	- WATER COLUMN VALUES	

MESSENGER TIME 2147 INCOMING SOLAR RADIATION - AM 195 PM 208

CNAV OSHAWA CRUISE OS2 STATION 082 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.01	0.00	31.891	0.000	24.01	391.2	0.000	0.00	6.12	0.00	
10	13.01	0.04	31.892	0.004	24.01	391.5	0.040	0.02	6.17	0.01	0.97
20	12.32	0.11	32.001	0.013	24.23	370.9	0.078	0.08	6.28	0.03	0.75
30	9.99	0.13	32.303	0.021	24.87	309.4	0.113	0.17	6.66	0.05	0.94
50	9.30	0.01	32.468	0.009	25.11	286.8	0.173	0.41	5.85	0.02	0.80
75	8.38	0.02	32.909	0.006	25.60	240.9	0.239	0.83	5.08	0.06	0.72
100	7.48	0.02	33.273	0.005	26.02	201.6	0.295	1.32	4.65	0.03	0.65
150	7.69	0.04	33.834	0.006	26.43	163.6	0.387	2.48	2.73	0.05	0.66
200	7.16	0.01	33.937	0.004	26.58	149.5	0.466	3.89	2.39	0.04	0.88
250	6.49	0.00	33.951	0.003	26.68	140.3	0.539	5.57	2.33	0.02	13.39

CNAV OSHAWA CRUISE OS2 STATION 083 OBSERVED VALUES

DATE 12/06/63 HR 08.0 LAT 47-43 N LONG 125-35 W SNDG 1134 WEA 01 WIND VEL 12 DIR 28
BAROM 13.0 TEMP DRY 11.7 WET 10.0 RELHU 81 WTRCLR SECDI SEA 2 DIR 28 SWELL 2 DIR 34
CLOUD TYPE AMT 2 VIS 7 WIRE ANGLE(S) 17,25

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN			
					ML/L	MGA/L	AOU	SATN
1	0	12.49	31.762	24.01	6.25	0.558	-0.029	105
1	5	12.48	31.763	24.01	6.32	0.564	-0.035	107
1	10	12.38	31.753	24.02	6.29	0.562	-0.031	106
1	19	11.83	31.794	24.16	6.41	0.573	-0.035	107
1	28	10.37	32.156	24.69	6.36	0.568	-0.015	103
1	47	9.55	32.411	25.03	5.95	0.531	0.031	94
1	71	8.87			5.19	0.464		
1	95	8.71	33.330	25.88	3.84	0.343	0.227	60
1	119	8.11	33.674	26.24	3.11	0.278	0.299	48
1	143	7.67	33.830	26.42	2.70	0.241	0.341	41
1	167	7.27	33.913	26.55	2.71	0.242	0.345	41
2	180	7.20	33.930	26.57	2.42	0.216	0.372	37
2	226	6.72	33.956	26.66	2.27	0.203	0.392	34
2	271	6.29	33.984	26.74	1.95	0.174	0.426	29
2	455	5.19	34.099	26.96	0.87	0.078	0.539	13
2	686	4.34	34.256	27.18	0.30	0.027	0.602	4
2	919		34.372		0.27	0.024		
2	1014		34.413		0.30	0.027		

CNAV OSHAWA CRUISE OS2 STATION 083 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.49	0.00	31.762	0.000	24.01	391.2	0.000	0.00	6.25	0.00	
10	12.38	0.00	31.753	0.000	24.02	390.0	0.040	0.02	6.29	0.00	
20	11.67	0.03	31.830	0.008	24.21	372.1	0.078	0.08	6.41	0.00	0.86
30	10.21	0.04	32.198	0.012	24.75	320.6	0.113	0.17	6.33	0.00	0.97
50	9.44	0.00	32.467	0.007	25.09	289.0	0.175	0.42	5.88	0.01	1.00
75	8.84	0.02	32.942	0.028	25.55	245.2	0.242	0.84	4.96	0.03	1.03
100	8.60	0.02	33.413	0.003	25.96	207.1	0.299	1.35	3.65	0.01	0.76
150	7.53	0.01	33.861	0.000	26.47	159.4	0.391	2.50	2.72	0.04	0.76
200	7.01	0.02	33.944	0.002	26.61	146.9	0.468	3.88	2.28	0.06	1.21
250	6.48	0.00	33.971	0.000	26.70	138.7	0.540	5.54	2.11	0.01	0.57
300	6.07	0.02	34.002	0.000	26.78	131.7	0.608	7.46	1.75	0.00	1.25
400	5.44	0.02	34.064	0.000	26.90	120.5	0.736	12.01	1.14	0.01	1.07
500	5.02	0.01	34.131	0.001	27.01	111.6	0.853	17.41	0.70	0.01	61.99
600	4.68	0.03	34.199	0.002	27.10	103.4	0.961	23.53	0.43	0.01	54.77
700			34.264	0.000					0.29	0.00	0.92
800			34.317	0.001					0.24	0.02	0.89
1000			34.407	0.000					0.30	0.00	4.22

CNAV OSHAWA CRUISE OS2 STATION 084 OBSERVED VALUES

HOH RIVER

DATE 12/06/63 HR 10.8 LAT 47-43 N LONG 125-00 W SNDG 139 WEA 01 WIND VEL 8 DIR 32
BAROM 14.0 TEMP DRY 11.1 WET 10.0 RELHU 87 WTRCLR SECDI SEA 2 DIR 28 SWELL 1 DIR 34
CLOUD TYPE AMT 1 VIS 7 WIRE ANGLE(S) 18

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN
1	0	12.54	31.435	23.75	6.33	0.565	-0.035	107
1	5	12.52	31.428	23.74	6.41	0.573	-0.042	108
1	10	12.52	31.431	23.75	6.44	0.575	-0.045	108
1	19	11.36	31.682	24.15	6.36	0.568	-0.025	105
1	29	9.62	32.272	24.91	6.07	0.542	0.020	96
1	48	8.79	32.555	25.26	5.38	0.481	0.091	84
1	72	7.91	33.086	25.81	4.52	0.404	0.178	69
1	95	7.47	33.559	26.24	3.39	0.303	0.283	52
1	119	7.30	33.774	26.43	3.05	0.272	0.315	46

CNAV OSHAWA CRUISE OS2 STATION 084 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	SAL
0	0.95	1.29		31.432
6	0.91	1.58		31.425
25	1.99	0.71		31.909
60	0.07	0.00		32.782
100	0.04	0.00		33.028
	69.25	42.75	- WATER COLUMN VALUES	

MESSENGER TIME 0310

CNAV OSHAWA CRUISE OS2 STATION 084 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.54	0.00	31.435	0.000	23.75	416.2	0.000	0.00	6.33	0.00	
10	12.52	0.00	31.431	0.000	23.75	416.3	0.042	0.02	6.44	0.00	
20	11.18	0.02	31.740	0.009	24.23	370.2	0.082	0.08	6.34	0.00	0.88
30	9.53	0.03	32.299	0.010	24.94	302.6	0.116	0.17	6.04	0.00	0.97
50	8.70	0.00	32.596	0.003	25.31	268.4	0.173	0.40	5.31	0.00	0.91
75	7.83	0.00	33.156	0.004	25.87	214.8	0.234	0.78	4.36	0.02	0.83
100	7.41	0.00	33.635	0.003	26.31	173.8	0.283	1.22	3.21	0.01	5.19

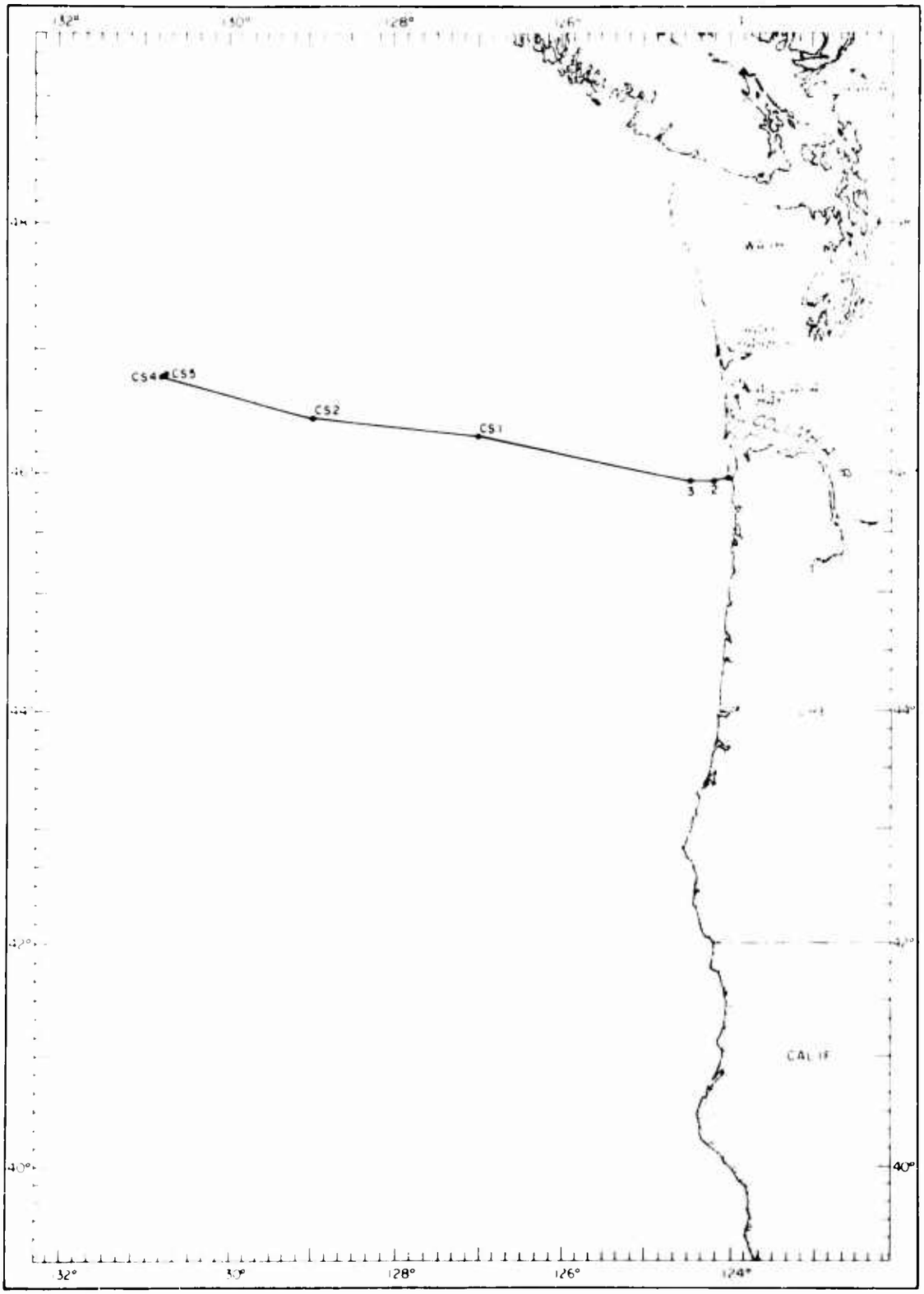

Fig. 2. Station locations Brown Bear Cruise 327, 24 June — 1 July 1963.

BROWN BEAR CRUISE 327 STATION 001 OBSERVED VALUES

TILLAMOOK HEAD

DATE 25/06/63 HR 00.0 LAT 45-56.2N LONG 124-01.0W SNDG 59 WEA X8 WIND VEL 17 DIR 21
BAROM 22.0 TEMP DRY 13.1 WET 12.8 RELHU 97 WTRCLR SECDI DOM WAVE DIR 21 HI 3 PER 2
CLOUD TYPE 5 AMT 8 VIS 6 WIRE ANGLE(S) 12

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN				PHOS
					ML/L	MGA/L	AOU	SATN	
1	0	13.38	26.127	19.50	8.13	0.726	-0.186	135	0.20
1	5	13.32	26.657	19.92	8.27	0.739	-0.200	137	0.18
1	10	11.22	31.782	24.26	6.92	0.618	-0.074	114	0.62
1	15	10.28	32.538	25.01	6.10	0.545	0.008	99	1.04
1	20	9.49	32.702	25.26	4.70	0.420	0.142	75	1.74
1	25	8.35	32.886	25.59	3.36	0.300	0.276	52	2.09
1	30	8.10	33.259	25.91	3.17	0.283	0.295	49	2.10
1	39	7.60	33.817	26.42	2.14	0.191	0.392	33	2.43
1	49	7.37	33.883	26.51	1.90	0.170	0.416	29	2.49

BROWN BEAR CRUISE 327 STATION 001 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.38	0.00	26.127	0.000	19.50	823.1	0.000	0.00	8.13	0.00	
10	11.22	0.00	31.782	0.000	24.26	367.7	0.060	0.02	6.92	0.00	
20	9.49	0.00	32.702	0.000	25.26	271.8	0.093	0.07	4.70	0.00	
30	8.10	0.00	33.259	0.000	25.91	210.2	0.117	0.13	3.17	0.00	

BROWN BEAR CRUISE 327 STATION 002 OBSERVED VALUES

DATE 25/06/63 HR 01.6 LAT 45-55.0N LONG 124-10.8W SNDG 95 WEA X2 WIND VEL 16 DIR 34
BAROM 23.0 TEMP DRY 12.4 WET 12.1 RELHU 97 WTRCLR SECDI DOM WAVE DIR 34 HT 4 PER
CLOUD TYPE 5 AMT 9 VIS 4 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN				PHOS
					ML/L	MGA/L	AOU	SATN	
1	0	12.42	27.378	20.64	7.75	0.692	-0.146	127	0.34
1	5	10.58	31.856	24.43	5.80	0.518	0.034	94	0.97
1	10	9.48	32.737	25.29	4.94	0.441	0.121	78	1.46
1	14	8.82	32.892	25.52	3.58	0.320	0.250	56	2.10
1	19	8.08	33.149	25.83	3.04	0.272	0.307	47	2.19
1	24	7.86	33.340	26.01	2.71	0.242	0.339	42	2.22
1	29	7.66	33.490	26.16	2.92	0.261	0.322	45	2.20
1	38	7.42	33.809	26.44	2.16	0.193	0.392	33	2.49
1	57	6.96	33.955	26.62	1.75	0.156	0.435	26	2.64
1	76	6.64	33.980	26.69	1.80	0.161	0.435	27	2.51

BROWN BEAR CRUISE 327 STATION 002 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	12.42	0.00	27.378	0.000	20.64	713.6	0.000	0.00	7.75	0.00	
10	9.48	0.00	32.737	0.000	25.29	268.9	0.050	0.01	4.94	0.00	
20	8.01	0.01	33.191	0.001	25.87	213.8	0.074	0.05	2.94	0.01	0.77
30	7.63	0.00	33.528	0.004	26.19	183.6	0.094	0.10	2.86	0.03	0.94
50	7.12	0.00	33.950	0.023	26.60	145.6	0.127	0.23	1.78	0.05	0.79
75	6.65	0.00	33.970	0.004	26.68	138.4	0.163	0.46	1.77	0.01	33.28

BROWN BEAR CRUISE 327 STATION 003 OBSERVED VALUES

DATE 25/06/63 HR 03.7 LAT 45-55.0N LONG 124-26.5W SNDG 82 WEA X1 WIND VEL 10 DIR 33
BAROM 24.0 TEMP DRY . WET . RELHU WTRCLR SECDI DOM WAVE DIR 32 HT 2 PER
CLOUD TYPE 5 AMT 7 VIS 6 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN	PHOS
1	0	13.23	30.226	22.68	8.68	0.775	-0.248	147	0.26
1	5	12.70	30.754	23.19	8.53	0.762	-0.231	144	0.43
1	10	11.48	32.012	24.39	7.13	0.637	-0.097	118	0.87
1	15	10.34	32.264	24.78	6.37	0.569	-0.016	103	0.97
1	19	9.70	32.347	24.95	5.71	0.510	0.051	91	1.17
1	29	8.45	32.636	25.38	4.95	0.442	0.134	77	1.49
1	38	8.34	32.872	25.58	3.83	0.342	0.234	59	2.03
1	57	7.72	33.627	26.26	2.20	0.196	0.385	34	2.54
1	77	7.43	33.899	26.51	1.86	0.166	0.419	28	2.62
1	95	6.97	33.980	26.64	1.96	0.175	0.416	30	2.76
1	114	6.45	33.992	26.72	1.65	0.147	0.451	25	2.82
1	134	6.42	33.995	26.73	1.58	0.141	0.458	24	2.85

BROWN BEAR CRUISE 327 STATION 003 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.23	0.00	30.226	0.000	22.68	517.9	0.000	0.00	8.68	0.00	
10	11.48	0.00	32.012	0.000	24.39	355.1	0.044	0.02	7.13	0.00	
20	9.54	0.01	32.374	0.002	25.00	296.9	0.077	0.07	5.62	0.03	1.00
30	8.42	0.02	32.661	0.002	25.40	259.1	0.105	0.14	4.83	0.01	0.85
50	7.96	0.03	33.357	0.032	26.01	201.3	0.152	0.32	2.67	0.01	0.78
75	7.46	0.01	33.888	0.005	26.50	155.2	0.197	0.60	1.85	0.01	0.88
100	6.81	0.02	33.987	0.002	26.67	139.6	0.234	0.94	1.89	0.02	0.73

BROWN BEAR CRUISE 327 STATION CS1 OBSERVED VALUES

DATE 25/06/63 HR 18.5 LAT 46-17.0N LONG 127-00.0W SNDG 2679 WEA X2 WIND VEL 9 DIR 29
BAROM 28.0 TEMP DRY . WET . RELHU WTRCLR SECDI SEA 2 DIR 29 SWELL 2 DIR 37
CLOUD TYPE 6 AMT 7 VIS 7 WIRE ANGLE(S) 6

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN				PHOS
					ML/L	MGA/L	AOU	SATN	
1	0	14.43	31.778	23.63	6.14	0.548	-0.040	108	0.40
1	5	14.49	31.778	23.62	6.15	0.549	-0.041	108	0.31
1	10	14.49	31.774	23.62	6.17	0.551	-0.043	108	0.33
1	25	13.27	32.269	24.25	6.41	0.573	-0.053	110	0.43
1	49	10.00	32.468	25.00	6.54	0.584	-0.028	105	0.66
1	74	9.10	32.665	25.30	5.80	0.518	0.049	91	1.09
1	98	8.20	33.130	25.80	4.72	0.422	0.156	73	1.64
1	149	7.81	33.698	26.30	3.33	0.297	0.283	51	1.91
1	198	7.37	33.913	26.53	2.72	0.243	0.343	41	2.29
1	247	6.56	33.940	26.67	2.96	0.264	0.332	44	2.32
1	296	6.16	33.987	26.75	2.12	0.189	0.413	31	2.69

BROWN BEAR CRUISE 327 STATION CS1 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.43	0.00	31.778	0.000	23.63	426.8	0.000	0.00	6.14	0.00	
10	14.49	0.00	31.774	0.000	23.62	428.6	0.044	0.02	6.17	0.00	
20	13.81	0.04	32.078	0.039	23.99	393.2	0.085	0.09	6.32	0.01	0.88
30	12.56	0.11	32.341	0.020	24.44	350.4	0.122	0.18	6.48	0.01	0.84
50	9.94	0.02	32.473	0.002	25.01	296.4	0.188	0.44	6.52	0.00	0.94
75	9.06	0.00	32.683	0.003	25.32	267.7	0.259	0.89	5.76	0.00	0.94
100	8.17	0.01	33.161	0.001	25.83	219.5	0.320	1.44	4.65	0.00	0.99
150	7.80	0.00	33.705	0.000	26.31	174.8	0.419	2.68	3.31	0.00	0.97
200	7.34	0.01	33.916	0.001	26.54	153.4	0.502	4.16	2.73	0.01	0.94
250	6.52	0.00	33.940	0.001	26.67	141.4	0.576	5.87	2.96	0.01	5.22

BROWN BEAR CRUISE 327 STATION CS2 OBSERVED VALUES

DATE 26/06/63 HR 00.9 LAT 46-25.0N LONG 127-57.0W SNDG 2725 WEA X2 WIND VEL 14 DIR 25
BAROM 27.0 TEMP DRY 14.2 WET 11.7 RELHU 74 WTRCLR SECDI DOM WAVE DIR 34 HT 2 PER
CLOUD TYPE 7 AMT 8 VIS 5 WIRE ANGLE(S) 20,15

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN				PHOS
					ML/L	MGA/L	AOU	SATN	
2	0	14.15	32.550	24.29	6.24	0.557	-0.048	110	0.97
2	5	14.23	32.554	24.27	6.16	0.550	-0.042	108	0.97
2	10	14.22	32.547	24.27	6.20	0.554	-0.046	109	0.93
2	15	14.04	32.577	24.33	6.16	0.550	-0.040	108	1.01
2	20	13.74	32.566	24.38	6.10	0.545	-0.032	106	0.54
2	30	12.15	32.569	24.70	6.37	0.569	-0.038	107	0.62
2	39	10.57	32.555	24.97	6.52	0.582	-0.033	106	0.69
2	59	9.48	32.550	25.15	6.34	0.566	-0.003	101	0.82
2	79	9.27	32.530	25.17	6.43	0.574	-0.009	102	0.87
2	98	9.20	32.595	25.23	6.31	0.564	0.003	100	0.93
2	123	7.55	32.956	25.76	5.73	0.512	0.075	87	0.88
2	148	7.18	33.410	26.16	4.86	0.434	0.156	74	1.67
2	197	7.15	33.850	26.51	3.80	0.339	0.249	58	1.99
2	247	6.42	33.928	26.67	3.10	0.277	0.322	46	2.84
2	296	5.91	33.978	26.78	2.07	0.185	0.421	30	2.71
1	369	5.18	34.005	26.89	1.57	0.140	0.477	23	2.95
1	554	4.54	34.158	27.08	0.56	0.050	0.576	8	3.28
1	738	4.06	34.280	27.23	0.31	0.028	0.606	4	3.30

BROWN BEAR CRUISE 327 STATION CS2 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	14.15	0.00	32.550	0.000	24.29	364.6	0.000	0.00	6.24	0.00	
10	14.22	0.00	32.547	0.000	24.27	366.5	0.037	0.02	6.20	0.00	
20	13.74	0.00	32.566	0.000	24.38	355.9	0.074	0.08	6.10	0.00	
30	12.15	0.00	32.569	0.000	24.70	326.2	0.108	0.16	6.37	0.00	
50	9.71	0.10	32.551	0.002	25.11	287.0	0.170	0.41	6.45	0.04	0.83
75	9.27	0.02	32.531	0.003	25.17	282.1	0.242	0.87	6.41	0.01	0.77
100	9.08	0.04	32.616	0.003	25.26	273.3	0.311	1.50	6.28	0.00	0.91
150	7.18	0.01	33.437	0.002	26.19	186.1	0.427	2.93	4.80	0.00	0.98
200	7.11	0.01	33.860	0.003	26.53	154.5	0.513	4.45	3.76	0.01	0.92
250	6.39	0.00	33.932	0.000	26.68	140.3	0.587	6.16	3.03	0.01	0.92
300	5.87	0.00	33.980	0.001	26.79	130.8	0.656	8.09	2.03	0.01	0.96
400	5.01	0.04	34.027	0.004	26.93	118.0	0.781	12.57	1.36	0.01	1.00
500	4.63	0.05	34.109	0.005	27.03	108.6	0.896	17.83	0.80	0.01	0.83
600	4.48	0.03	34.199	0.002	27.12	101.2	1.002	23.81	0.41	0.01	21.85
700	4.24	0.03	34.266	0.003	27.20	94.3	1.100	30.39	0.28	0.01	20.78

BROWN BEAR CRUISE 327 STATION CS4 OBSERVED VALUES

AT ANCHOR ON PINNACLE OF COBB SEAMOUNT

DATE 27/06/63 HR 04.8 LAT 46-46.4N LONG 130-48.8W SNDG 82 WEA X3 WIND VEL 9 DIR 33
BAROM 15.0 TEMP DRY 12.6 WET 9.8 RELHU 70 WTRCLR SECDI SEA 3 DIR 33 SWELL 1 DIR 32
CLOUD TYPE 8 AMT 3 VIS 7 WIRE ANGLE(S) 2

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN ADU	OXYGEN SATN	PHOS
1	0	13.08	32.550	24.50	6.91	0.617	-0.097	119	0.32
1	5	13.17	32.533	24.47	6.35	0.567	-0.048	109	
1	10	13.15	32.542	24.48	6.39	0.571	-0.051	110	
1	20	13.01	32.547	24.51	6.39	0.571	-0.050	110	
1	30	11.57	32.536	24.78	6.53	0.583	-0.046	109	
1	39	10.63	32.530	24.94	6.61	0.590	-0.042	108	
1	49	9.16	32.527	25.18	6.71	0.599	-0.032	106	
1	59	8.87	32.519	25.22	6.87	0.614	-0.043	107	
1	70	8.82	32.520	25.23	6.85	0.612	-0.040	107	
1	80	8.62	32.525	25.26	6.90	0.616	-0.042	107	0.78

BROWN BEAR CRUISE 327 STATION CS4 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.08	0.00	32.550	0.000	24.50	344.0	0.000	0.00	6.91	0.00	
10	13.15	0.00	32.542	0.000	24.48	346.2	0.035	0.02	6.39	0.00	
20	13.01	0.00	32.547	0.000	24.51	343.4	0.070	0.07	6.39	0.00	
30	11.57	0.00	32.536	0.000	24.78	318.4	0.103	0.16	6.53	0.00	
50	9.10	0.01	32.526	0.000	25.19	279.5	0.164	0.40	6.73	0.00	0.87
75	8.76	0.01	32.522	0.000	25.24	275.2	0.233	0.85	6.85	0.01	4.09

BROWN BEAR CRUISE 327 STATION CS5 OBSERVED VALUES

AT ANCHOR ON PINNACLE OF COBB SEAMOUNT

DATE 28/06/63 HR 06.4 LAT 46-47.0N LONG 130-46.0W SNDG 260 WEA X2 WIND VEL 17 DIR 32
BAROM 21.0 TEMP DRY 12.4 WET 10.4 RELHU 78 WTRCLR SECDI SEA 2 DIR 32 SWELL 2 DIR 27
CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN ML/L	OXYGEN MGA/L	OXYGEN AOU	OXYGEN SATN	PHOS
1	0	13.02	32.544	24.51					0.58
1	5	13.08	32.546	24.50					
1	10	13.08	32.549	24.50					0.67
1	25	13.03	32.543	24.51					0.64
1	49	9.53	32.536	25.13					0.78
1	74	8.50	32.531	25.29					0.90
1	98	7.22	32.972	25.82					1.62
1	148	6.61	33.641	26.42					1.67
1	197	6.44	33.817	26.58					

BROWN BEAR CRUISE 327 STATION CS5 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.02	0.00	32.544	0.000	24.51	343.3	0.000	0.00			
10	13.08	0.00	32.549	0.000	24.50	344.3	0.035	0.02			
20	13.14	0.06	32.546	0.001	24.49	346.0	0.070	0.07			0.88
30	12.37	0.18	32.541	0.000	24.63	332.3	0.104	0.16			0.84
50	9.47	0.02	32.531	0.003	25.14	284.7	0.166	0.41			0.94
75	8.44	0.01	32.546	0.003	25.31	268.8	0.236	0.85			4.09
100	7.16	0.01	33.007	0.001	25.85	217.2	0.297	1.40			0.98
150	6.25	0.23	33.659	0.000	26.48	157.6	0.392	2.57			14.46

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13. ABSTRACT

This report contains tabulated physical, chemical, and biological data collected during Cruise Oshawa-2 of the CNAV Oshawa and Cruise 327 of the Research Vessel Brown Bear during the morths of May - June 1963 in an area within 335 miles of the coasts of Washington, Oregon and northern California. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific.

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14. KEY WORDS	LINK A		LINK B		LINK C	
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